

AMERICAN ARTISAN

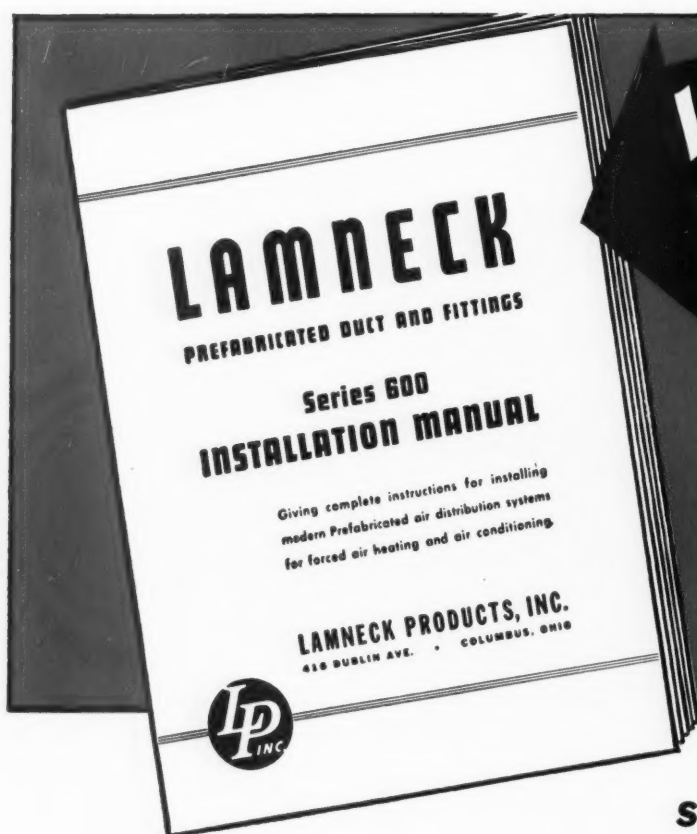
WARM AIR HEATING • AIR CONDITIONING
SHEET METAL CONTRACTING

AIR
CONDITIONING
SECTION
PAGE 39



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JUNE
1938



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• NO BOW IN THIS "BABY" •

Straight as a String—

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In This Issue

IN this issue we have devoted more than usual space to one subject. The particular subject of this issue is FHA and FHA's low cost houses. The cover photograph, for instance, shows two of a double row of low cost houses in Toledo, where two-story houses without basements have been built in appreciable numbers. The description of the heating plant in one of these houses is presented in the air conditioning section.

★

Much has been written about FHA and the aims of its 1938 program. Some of the things said of the program are not entirely true — also, there are some things hidden in the various enacting bills which most contractors do not know about. So, in this issue, we present the facts as gathered by Arnold Kruckman at first hand from dozens of individuals and departments right in Washington.

★

This information from Washington is supplemented by a group study of heating systems installed in low cost houses around the country. To get these actual plans, dozens of letters were addressed to contractors in all parts of the country. From the systems submitted, ten jobs were selected. These ten installations cover all the ramifications of low cost house installation brought to our attention. We hope this group study will furnish readers with essential data to bid on this type of work.

★

But before any large volume of house building can get under way, people must **want** to buy a home. They must **want** a home so bad that they are willing to make a personal investigation to find out how much a home really costs. In the Quad Cities a campaign is under way to prove that "building costs are not too high" and thereby stimulate home construction. See page 24 for details. Perhaps a like campaign will start building in your city.

★

We have found space, also for some other interesting new projects — the use of chromium nickel stainless steel for house drainage systems (page 36); a description of the metal work on the Newark, N. J. Union Station (page 30) where most of the metal is cast and extruded aluminum; we begin publication on page 27 of the furnace ordinance of Sioux City, Iowa (a very good code); another chapter of G. A. Voorhees Precalculated Engineering; and the concluding report on attic ventilation from southwest cities.

AMERICAN ARTISAN

With which is merged

**FURNACES
AND
SHEET METALS**

AND

**Warm-Air
Heating**

Covering All Activities in

Gravity Warm Air Heating Forced Warm Air Heating
Sheet Metal Contracting Ventilating
Air Conditioning

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Brewster S. Beach, Consulting Editor

Vol. 107, No. 6

June, 1938

Founded 1880

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More than 8,000 Copies of this Issue are being distributed

THERE ARE **PLENTY** OF **JOBS**

AT THE TOP

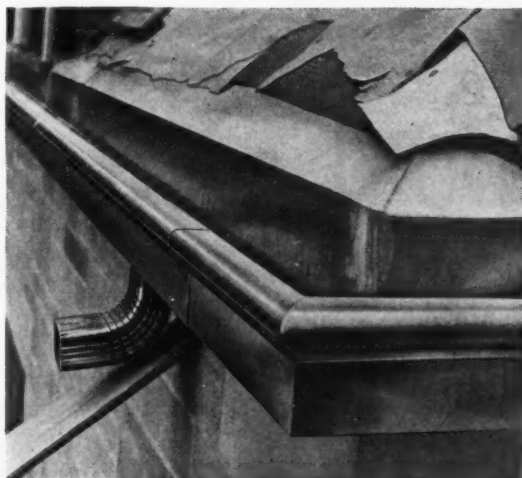


The move is all toward Monel. Even the Old South Meeting House in Boston now has need of this enduring metal. Recently repaired, it was found that the nails holding its slates were badly corroded. Monel nails which replaced them resist the corrosive effects of snow and rain, and the smoky city atmosphere; so are good for many years of service.

**PUBLIC BUILDINGS, INSTITUTIONS AND
LARGE RESIDENCES OFFER PLENTY OF
OPPORTUNITY TO SELL MONEL ROOFS**



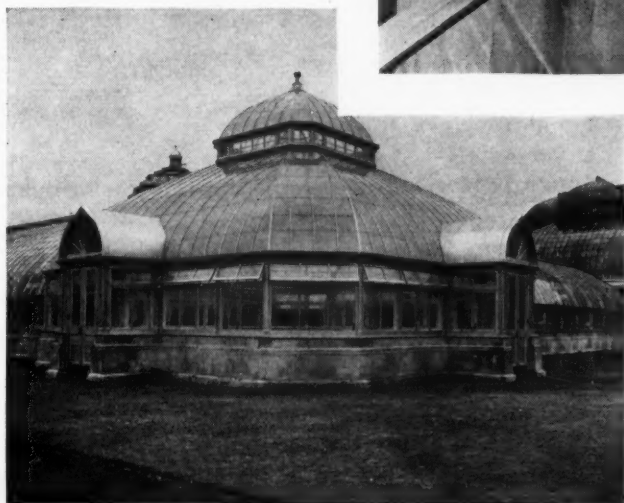
(Below) The kind of buildings that need Monel roofs furnish opportunities for big and profitable jobs. Such buildings include: Museums, art galleries, big banks, city, county, state and federal buildings. On this wing of the Botanical Garden in Bronx Park, N. Y. Monel flashings and caps were installed by the J. J. Fisher Co. of Brooklyn, N. Y., and Erdhein and Wall of New York City.



Typical of the kind of job open to the alert sheet metal contractor is this one at the New York World's Fair. Erected to house the exhibit of New York City, this building is equipped with Monel flashing. Photo shows the Monel flashing, and stone slabs being lifted into place.

• • •

(Left) Owners of better class homes are also prospects for Monel roofs. In White Plains, N. Y., the residence of Doctor Murray was equipped with Monel box gutter and flashing, as shown in this photo. Installed by W. R. Robinson Co. of Elmsford, N. Y. Architect, E. E. Embury of New York City.



If you know of any buildings like those listed above, where the old roofing material has failed ... buildings where you think you *might* sell Monel with some help from us ... write us. There are lots of ways we can lend you a hand. See if we can't be of service to you. Address:



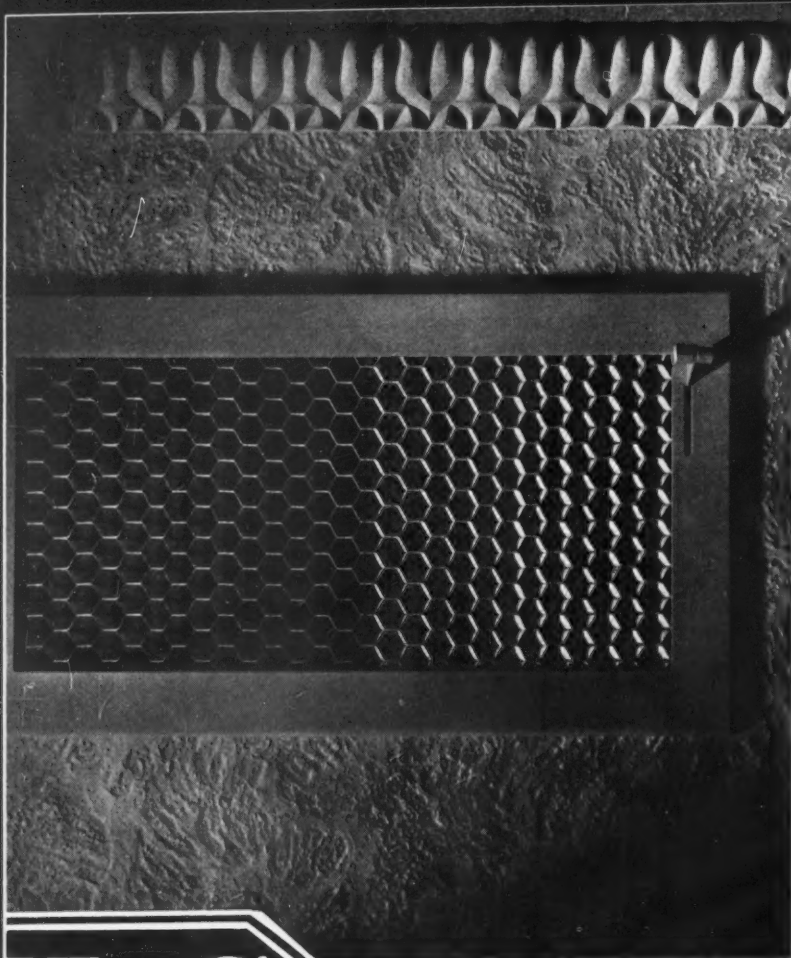
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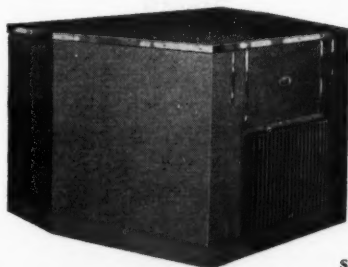
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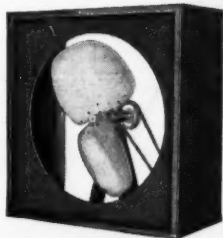
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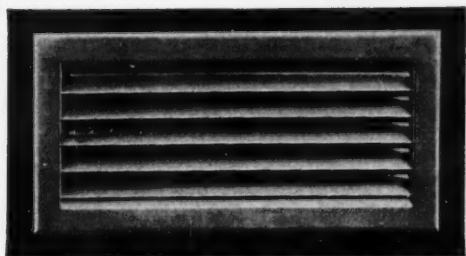
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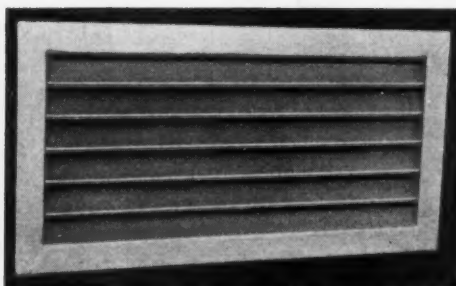
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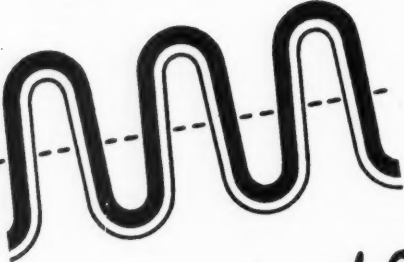
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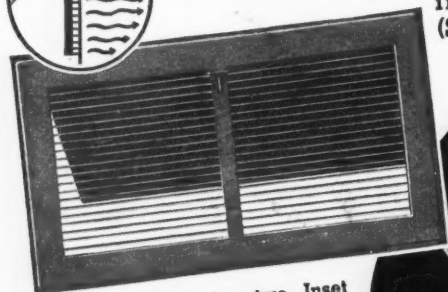


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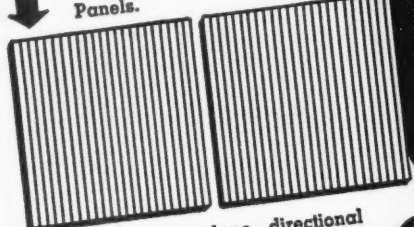


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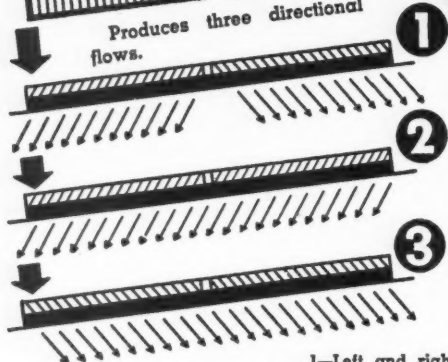
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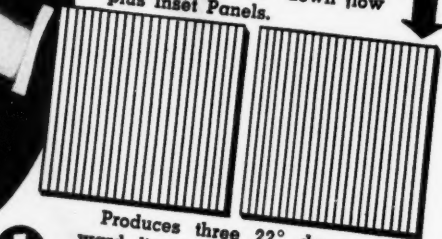
1—Left and right flow. 2
—All left flow. 3—All right
flow. Register without pan-
els delivers straight horizon-
tal flow.



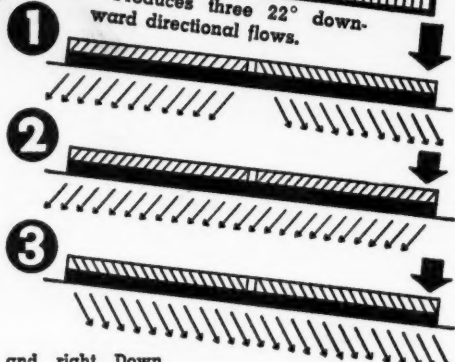
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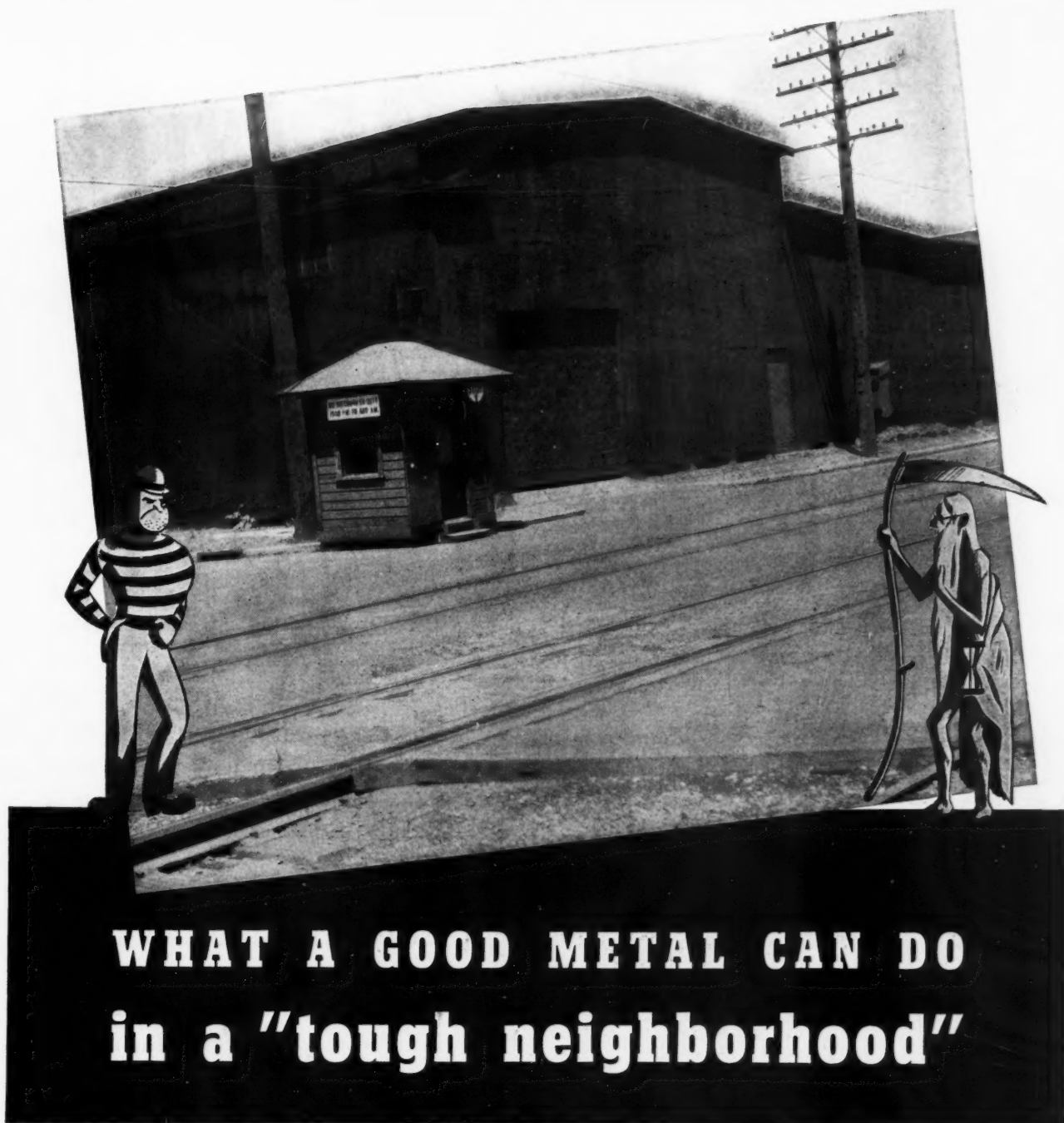
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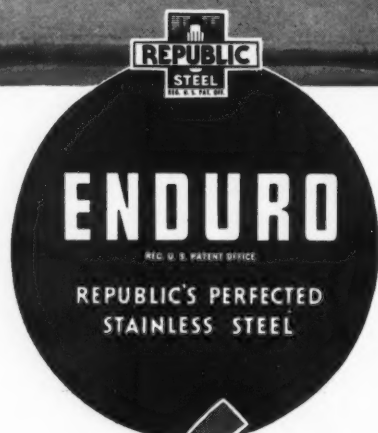
Right at your finger tips, waiting for you to grasp it, is a substantial volume of profitable business.

Stores, theatres, restaurants and other retail establishments have learned what it means to have an attractive front. Many have built new fronts or remodeled old ones—and there are thousands of others who can be sold.

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Many sheet metal contractors—such as the fabricators of this Rochester, N.Y., store front—are taking advantage of this opportunity by stocking and using ENDURO. Why not take the first step toward getting some of this business for yourself by writing for full information on ENDURO? Republic Steel Corporation, Alloy Steel Division, Massillon, Ohio—General Offices, Cleveland, O.

Whatever your needs in sheet products, remember that Republic makes a grade, size and finish for every purpose.



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TRUSCON STEEL COMPANY

AMERICAN

Volume 107



ARTISAN

Number 6

F H A

THE revival of Titles 1 and 2 of the Federal Housing Act are expected to do much to stimulate modernization of old, and construction of new, houses. Under both titles the warm air heating and sheet metal industry is expected to get a generous share of the money borrowed. . . . Some features of the revived act are not universally understood. On the following six pages the whole picture of FHA as it effects our industry is presented first hand from Washington. . . . In the Air Conditioning Section we present a group study of heating systems actually installed in houses costing less than \$6,000. As will be seen, these systems depart somewhat from standard practice; houses have no basement; distributing systems must be concealed or carried through attic; equipment is special or specially handled; installed costs must be figured on a new basis.



Products or Services Eligible For Loans

SOMETIMES certain products or applications of products bring up the question—"Is this product or this application eligible for an FHA loan?"

The act as revised this year reads—"For repairs, alterations, or improvements upon or in connection with existing structures."

The question has been answered roughly—a product or application is eligible if that product or application becomes a fixed part of the building—not movable—or a fixed part of a system already existing.

On these two rulings and excepting specific cases, it seems the following services, products or applications common to our industry are eligible—

Furnaces of all types (excepting circulating heaters)

Blowers for furnace application

Blowers or fans for attic ventilation (must be built in)

Ventilating system fans or blowers (industrial, commercial)

Additions to or changes in duct work or ventilating or air conditioning systems

Summer cooling systems (installation and equipment)

Room cooling units (when built into the building)

Humidifiers

Control equipment (new or attached to existing systems)

Filters or filter-blower units

Revamping of gravity or forced air heating systems including new runs, new registers, new return airs, changing round pipes to rectangular ducts.

Oil burners

Stokers

Gutters and downspouts

Flashing (new or repair)

Roofs (repair or new) of all types—slate, tile, metal, roll, shingles, built up, etc.

Residing—roll, shingles, etc.

Dust collectors or collecting systems

Fume removal systems

Ventilating systems (industrial, commercial)

Skylights

Fire doors

Through wall flashing as repairs for leaky walls.

Spray booth systems and equipment.

This probably does not complete the list of products or services our industry takes by contract. In case of doubt the local office of FHA will have to give a ruling.

Title 1—Modernization

[And New Construction Under \$2,500]

By Arnold Kruckman

THE Federal Housing Administration, — colloquially known as the FHA—was created by the *National Housing Act* in 1934. The reference to the *National Housing Act* is italicized because often people do not remember the relation between this Law and the FHA. The agency came into being "to stimulate employment, to reduce mortgage rates, to initiate a system of uniform mortgage lending and appraisal practices, and to check catastrophic declines in real estate values during times of acute depression." This explanation of purposes was officially approved by Administrator Stewart McDonald.

Titles in the Act

Early this year the Act was again amended, presumably to stimulate building activities, increase employment, and fill the gap of the national need for 2,000,000 new homes. The Act is separated into subordinate parts, known as Titles, and consisting of five Titles. The sheet metal and furnace industry almost exclusively is interested in Titles I and II. Title I, designed to stimulate rehabilitation and modernization of existing structures, had been invalidated, but was revived early this year, temporarily, *until July 1, 1939*. Title II, designed to encourage the building of homes not to cost over \$6,000, was changed so that the amortization period was extended from 20 to 25 years, the premium was reduced from $\frac{1}{2}$ to $\frac{1}{4}$ of 1%, and the FHA was authorized to insure 90% of the amount of the loan required, the borrower being required to provide the remaining 10%. But these terms were limited

to apply only to loans negotiated *before July 1, 1939*. Thereafter the amortization period again will be limited to 20 years, the premium will be increased to $\frac{1}{2}$ of 1%, and the borrower must furnish 20% of the sum required, the FHA insuring 80% of the loan.

It is wise, probably, here, to reiterate that the FHA does *not* lend funds; it insures or guarantees the repayment of loans to the institutions, corporations, and persons, who lend the money. This brief discussion will present the features of the amended Act in the simplest terms.

The revived Title I is designed to provide relatively easy money for the modernization of existing homes and commercial buildings, *and to furnish funds for the building of NEW homes, commercial structures, and farm buildings, which may be built for \$2,500 or less.*

The FHA has given relatively little publicity to this feature of Title I. This part of the temporary task imposed upon it by the Congress is obviously out of the perspective of its own appraisal of its permanent purpose. For the FHA is a *permanent* Federal agency, here to stay. To understand the situation, it should be remembered that the major objective of the FHA is social, not economic. Its present temporary task of helping to vanquish a depression is incidental. If you bear in mind that the FHA is primarily an agency for social progress, you will have no difficulty in clearly grasping the whole FHA function.

Despite a lack of publicity covering new construction under Title I, it has become increasingly



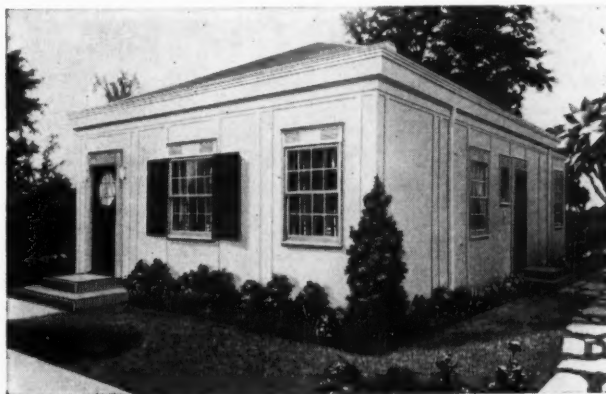
In Joplin, Missouri, the R. E. Stephens Agency, erected the group of seven low cost houses shown here. Some houses have basements; some no basements. In all houses a forced, warm air heating system with automatic control is provided. Prices range from \$4,000 to \$7,000.

clear that Title I offers industry the best opportunity for profitable straight business enterprise along established lines of operation. Contractors, and dealers in building materials and equipment, may profitably concentrate upon utilization of the resources of Title I as soon as they understand its mechanics and potentialities.

Who May Borrow?

Any one with a reasonable income and reputation, whether wage-earner, salaried employee, professional, business man, or farmer, may do business under Title I without putting up ten percent of the cost of the improvement. That means they may, with FHA insurance, borrow ALL the money they require for their improvements. Moreover, these modernization or rehabilitation or improvement loans, up to \$10,000, may be secured by a tenant as well as by the owner of a building. A tenant is eligible if he can repay the loan six months before his lease expires. Furthermore, the owner or tenant of several separate houses, or the operator of a chain of stores, or warehouses, or of several separate building units, in the same city, county or State, or in different political subdivisions, may negotiate loans up to \$10,000 for improvements to each separate structure.

Aside from roofs and gutters and similar obvious repairs and replacements, the funds may be used



This steel frame house built by the Harnischfeger Corp., Milwaukee, with six rooms, selling for less than \$4,000, erected, may be had with or without basement, flat or pitched roof.

to install heating and air-conditioning equipment, automatic heating devices, or any similar, built-in, improvement.

Loans of \$2,500 or less are made upon the basis of simple, verified, credit statements. In other words, they are pure character loans. Larger loans usually require some conventional form of supporting security. The borrower has 5 years to repay the modernization improvement loan, and he may liquidate his debt in monthly installments, or by quarterly, semi-annual, annual, or seasonal payments. The maximum interest charge is 5% per annum.

As an example, assuming the loan amounts to \$100, the borrower would repay principal, interest

and charges, in 12 installments, at the rate of \$9.72 per installment. The borrower makes a simple note, pledges himself to spend the loan for the specified purpose, and then receives the funds, which are turned over to him without more ado. He makes his own deals without Government supervision, and the contractor performs his job without special regulation or supervision by Government inspectors, or without financial relations with the Government.

New structures costing \$2,500, or less, built exclusively for non-residential purposes, may consist of barns, garages, service buildings, wayside stands, tourists cabins, gasoline stations, industrial and commercial buildings, or almost any type of non-residential structure the imagination may suggest. The authority to insure loans for this purpose is specifically set forth in Class 2 of Title I. The conditions for these loans are exactly the same as outlined above when the funds are used for modernization.

Heating Industry to Profit

Class 2 of Title I, provides for loans that may be insured to build new *residential* structures costing \$2,500 or less. These loans mature in 7 years instead of 5, and the cost of interest and charges is over 3% less. Homes built under this classification must comply with minimum standards set by the FHA. These include compliance with all local and State ordinances and among a number of other requirements it is obligatory, when public water supply and sewage disposal are available, that bathrooms be provided, running water piped to all fixtures and to the kitchen sink, and a connection made to a public sewer. In the absence of a public sewer the same conditions are imposed except that a cesspool or septic tank must be installed.

Various, appropriate heating units are urged for use in these homes. It should be clearly understood, however, that the work is not appraised, nor is the job supervised, in any way, by the FHA. Like all other work done under Title I, class 3 affords the dealer and the contractor the major field in which individual initiative will prove effective in connection with the FHA jobs. The transaction is almost wholly local and red-tape has been reduced to a minimum.

Miss Mary Young, Administrative Assistant to Administrator McDonald, is responsible for the assertion that the heating industry has the best prospect for business among all industries under all classes of work embraced by Title I. Some one in the FHA believes that heating, plumbing and sheet metal work, will pre-empt considerably more than one-third of all business created by Title I. Air-conditioning, specifically suggested in most Classes of Title I is regarded as another major beneficiary of this part of the FHA program. It is further pointed out that most of the modernization jobs include what Miss Young calls "exterior face-lifting," and of which re-roofing, with its full complement of the uses of sheet metals, is almost invariably a part.

Title 2—New Construction

[Up to \$6,000 Total Cost]

LATE last year the National Housing Committee reported to the President that that part of the citizenry paying \$30 per month or less in rent or its equivalent needed at least 2,000,000 new dwellings. About the same time the Census Division of the Department of Commerce reported that 78% of the population living in towns and cities paid less than \$30 per month rent. And another report asserted that less than 11% of the total housing shortage affected those who paid more than \$30 per month rental.

These figures were interpreted to mean that the most urgent housing needs was for homes costing somewhere in the neighborhood of \$3,000. This situation led to the emphasis laid on the provisions of the National Housing Act covering the financing of homes by wage earners who might be induced to build simple, small homes.

Title I of the amended Act particularly offered inducements to those who will undertake the building of homes costing \$2,500 or less. The amendments to Title II effect the same purpose, even encouraging the building of units costing less than \$2,500. Title II, however, at the same time offers inducements to those who would undertake investments in new homes costing as much as \$6,000.



The houses in Harmon's Colonial Village, Chicago, sell for under \$6,000 and are warm air heated. All houses are two-story with basements.

There are ten sections in Title II, but only three of these sections are immediately interesting to the building industry, namely, Sections 203, 207 and 210. Sections 207 and 210 are more definitely designed to accomplish social reforms than to stimulate home construction.

Section 203 is subdivided into three classes. Class I is the part of the section that has the greatest interest to the building industry. It authorizes the FHA to insure loans for the building of homes that will cost not over \$6,000. Under the emergency amendment the loans may run 25 years and the borrower is required to make a down payment of only 10%. The FHA guarantees 90%. The premium is fixed at $\frac{1}{4}$ of 1%. However, *these terms are available only until July 1, 1939. Thereafter the loan matures in 20 years, the premium will be $\frac{1}{2}$*

of 1%, and the borrower will be obliged to make a down payment of 20%, the FHA guaranteeing 80% of the loan.

Class II provides insurance for loans up to \$10,000, the requirement up to July 1, 1939, being that on the first \$6,000 there must be a 10% down payment, and on the final \$4,000 the down payment must be 20%. The loans mature in 20 years. Class III provides insurance on loans up to \$16,000, requiring a down payment of 20% and maturing in 20 years.

The procedure under Section 203, regardless of the class of loan, is, roughly, this: If the application is for a loan of \$2,500, or less, a Credit Statement is furnished to the lending institution. This Credit Statement is similar to any similar statement furnished to those who are expected to extend credit. It is verified by the lending institution, which certifies it to the nearest of the 63 local offices of the FHA. Insurance for loans of \$2,500 or less is approved by the local FHA.

If the insurance is required for a loan *over* \$2,500, the application must be sent to Washington. When the Credit Statement—which is a Credit and Finance Statement on the larger loans—has been



The insulated Steel Construction house in Middletown, Ohio, is designed as the steel industry's answer to low cost housing. Mechanical warm air heat is specified.

approved, plans and specifications for the proposed building must be submitted to the FHA. They are checked either by the local FHA office, or are examined in Washington.

It is interesting to consider how the factors that enter into a summation of a proposed building—\$2,500 or \$16,000—appear to an FHA examiner. He considers the property from the standpoint of structural soundness, resistance to the elements, resistance to use, livability, the character of mechanical and convenience equipment, natural light and ventilation, architectural attractiveness, deviation from common practices which may be permitted by reason of exceptional conditions.

The location is considered in relation to economic stability, protection from adverse influences, transportation facilities, the need for housing, appeal, efficiency of utilities, adequacy of civic and social

centers, level of taxes, and topography. The borrower's reputation is studied, his personal attitude towards social problems, toward debts and past debts, his ability to pay and his prospects for the future are carefully checked. And, naturally, his social amenability comes into the question. In studying the mortgage pattern, the ratio of loan to the value is naturally considered, as well as the ratio of debt service to rental value, and the ratio of the life of the mortgage to the possible economic life of the building.

Minimum Construction Requirements

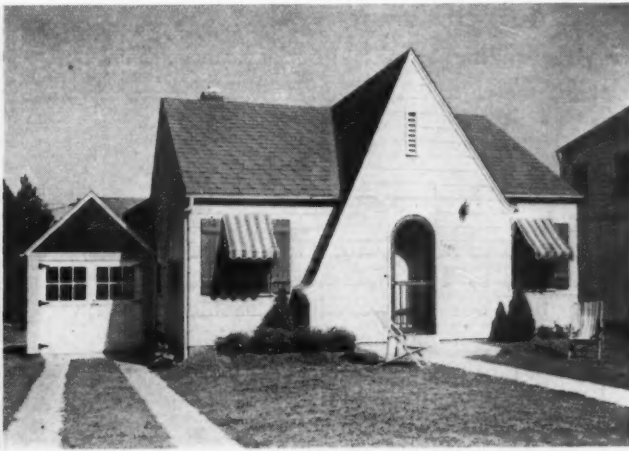
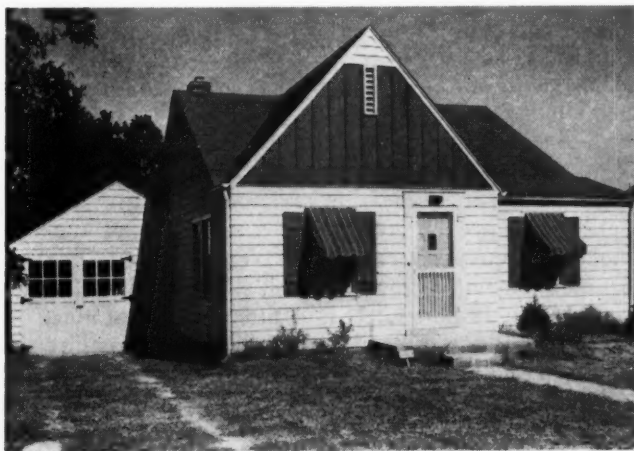
Since many factors involved are determined by compliance with the minimum construction requirements and "desirable characteristics," as set up by the FHA, it is interesting to sketch them here. The minimum construction requirements include specifications for excavation, masonry, footing, exterior masonry walls, chimneys, cement floors, driveways and walls, dampproofing, structural steel and iron, lumber, wood framings, exterior walls, interior partitions, stairs, termite prevention, roof covering sheet metal, lathing, plaster work, stucco, painting, plumbing, heating, electrical work.

As a basis for appraising the risk, the desirable characteristics are enumerated as: a homogeneous

Adequate light and ventilation is considered fundamental. Room arrangement and space economy are closely studied. The living room must be the largest in the house. Dining room should be no larger than necessary for the convenience of the type of family. Privacy is the special consideration in arranging bedrooms. Bathrooms naturally are located with reference to bedrooms. One closet is allowed to each bedroom. In small dwellings the tendency is to eliminate the basement, and place heating and laundry on the first floor. The design of the building must be popular; appropriate to the section of the country; simple and direct. Plenty of water must be available. In cold climates, pipes must be protected against freezing. It is required that heating and air-conditioning be so arranged that the house will be uniformly heated according to climatic conditions. Air-conditioning should depend on size of house and cost of fuel. Insulation is required as protection against cold and heat. Electric wiring is requisite.

Inspections of New Work

During the construction, three inspections are made by the FHA—the first after the laying of the foundations, but before the footings have been



Two bungalows on the same plan in the Stephens development in Joplin, Mo., illustrate how one basic plan can be altered exteriorly to avoid the 1928 mistake of appearance sameness. These houses use forced warm air heating.

neighborhood, in the same rent level; zoning which will offer security against decline in desirability; freedom from unusual fire, flood or corrosion danger; accessibility to employment areas, markets, schools and transportation; and it is held the house should be built on a minor street rather than on a major thoroughfare. It is required that there be ample space on all sides where windows will be located. Lots of 40 feet or wider are suggested for detached houses. Light, view and full sunlight is considered requisite. House must harmonize with its neighborhood, and planting should harmonize with the house. A study of the volume of traffic is made to determine that there is freedom from noise and ample light and air.

poured; the second when the framework is completed, to check on piping, wiring, etc.; and the last when the building is completed. Incidentally, but very importantly, the loan to pay for the job is deposited in the bank, or lending institution, to the credit of the borrower. But he may not draw upon it except with the approval of the FHA. The FHA gives permission for the withdrawal of the funds only in payment of the job, each time after an inspection has been made. It is patent, therefore, that those who furnish services or materials or equipment must work closely in harmony with the FHA officials in any building job that is performed under the regulations of Title II, Section 203.

The image displays a collection of five official forms used in the FHA loan process. From left to right, they are: the Credit Statement (FHE-3-CS), the Financial and Credit Statement (FHE-3-FCS), the Mortgage Statement (FHE-3-M), the Mortgage Property Description (FHE-3-MPD), and the Certificate of Conformance (FHE-4). Each form contains various sections for borrower information, financial details, property descriptions, and lender approvals.

The Routine of an FHA Loan

THE procedure of getting a loan under Title I, or Title II is simple. The prospective borrower should start by going either to a bank or to the nearest FHA office.

Modernization Loan

If the loan is to be used for Title I modernization improvements, to cost not more than \$2,500, the applicant fills out the Credit Statement, Form FHE-3-CS. Assuming he has visited the nearest FHA agency, which usually saves time, the FHA official will advise the applicant concerning the lending institutions in his community. No loans are insured unless the lending agency has been approved by the FHA. The Credit Statement is filed with the bank, or the building and loan association, insurance company, finance corporation, or the dealer or contractor prepared to handle the loan. (If a dealer or contractor accepts the responsibility for the loan, he in turn handles the paper through an approved fiscal agency, where the funds are placed in a special account, and disbursed at various stages of completion of the work, upon filing of a Statement of Completion signed by the contractor or dealer and the owner.)

After verifying the Credit Statement the bank sends it to the local FHA office for approval. A loan not exceeding \$2,500 is approved by the local FHA. It usually takes 48 hours to clear the preliminaries for a \$2,500 loan. The borrower then makes out a simple note, and receives his loan in cash or credit.

If the loan exceeds \$2,500, the applicant fills out

form FHE 3-FCS, the Financial and Credit Statement. Being an application for a sum in excess of \$2,500, it is sent to Washington where it is checked by the office of the FHA Deputy in charge of Title I transactions. In this instance the time between the filing of the application and the cashing of the applicant's note is prolonged by the airmail distance between the locality and Washington. The document usually goes through the Washington office within 24 hours. It is estimated transactions that must come to Washington for approval require from a week to ten days for consummation. All Title I—and Title II—applications for insured loans to build new dwellings must be supported by Form FHE 3-NDCS, (practically the same as form FHE 3-CS) an additional Credit Statement. Under Title I, applications concerning new structures, used either wholly or in part as residences, must be accompanied by Form FHE 4, a Certificate of Conformance, in which the applicant agrees to comply with a definite and detailed plan of building, and to use the funds loaned to pay in full, immediately upon completion of the structure, all mechanics, and material men's liens.

New House Loans

Applications for loans to build homes under Title II, Section 203, are started in the same manner as described in the procedure for modernization loans. After the applicant finds the approved lending agency which will make the loan the applicant fills out FHA Form No. 2004, which provides data concerning the building plans, and concerning his per-

sonal history, his economic history, and a description of his property. This is made out in triplicate, and is delivered by the applicant to the lending agency together with two sets of photographs, two photos measuring 3 inches by 5 inches in each set, one showing a front view of the lot upon which the house is to be built, the other presenting a street view of the lot with the lots adjoining.

The lending agency then sends the application to the local FHA preliminary examiner, who checks on the consistency with building standards, the relationship of the loan to the applicant's income, the applicant's financial status, all of which eventually determines the rejection or the further "processing" of the application. This examination is superficial, and is made only to determine whether or not the application broadly appears to be feasible. If it does not, the application is formally rejected in the name of the Chief Underwriter. However, if the preliminary examiner determines to recommend further processing he requires the applicant to send a check for not less than \$10, and at the rate of \$3 for each \$1,000 of the sum to be borrowed. This fee will cover the expense incurred by the FHA in examining the application, and in inspecting and evaluating the property. At the same time he also requires the submission of architectural drawings and building specifications which are sent with the application to the FHA.

The documents then are all sent to Washington where they first go to the Architectural Section, which determines if the plans comply with Minimum Construction requirements. If it survives this examination the application goes to the Valuation Section which sends an appraiser from the nearest office to evaluate the property. If he reports favorably the whole file goes to the Mortgage Risk Section where the Credit Statement is checked. Having surmounted all these examinations the file goes to the Review Section, where the various factors are considered as a unit. If it receives approval here it finally goes to the Chief Underwriter who, through his various deputies, must place his okeh upon all approved loans. With this final endorsement the lending agency is authorized to make an insured loan. The FHA here in Washington insists that, unless the application has some extraordinary defect or some unusual omission, the transaction may be completed in almost any part of the United States within a week, and, assuredly, within ten days.

Special machinery was set in motion on May 20 to make all privileges of Section 203 available to farm families. Title 1 likewise applies to farmers.

FHA Cost Analyses

Cost analyses are apparently a sore and irritating subject at the FHA. The officials and employees, who must have some yardstick for calculation, are furnished private and secret data. It is known that prior to February cost analyses were based upon a unit of cubic feet. There seems good reason to believe that estimators found themselves in the

embarrassing position of providing approximations that were far out of true when the houses were built. Moreover, it seems the estimates sometimes left the builder who had borrowed the money with an astonishing surplus of funds on hand after the job was done. Obviously such a situation might not cause the borrower great distress, but it was rather unpleasant for others involved.

A new system of estimating costs has been devised by Walter Young, Assistant to the Chief Underwriter. All that is known about the new system is that it is based upon square footage for building materials, and that fixtures are estimated upon a percentage basis in their relation to the cost of the rest of the structure. The new system is now in the process of being tested. It is promised that very interesting and valuable cost data will be made available to the industry in July. Mr. Young emphasizes the point that an important factor in replacement value is the presence in a building of mechanical equipment whose life is less than that of the building itself. He suggests that air-conditioning is particularly subject to replacement. In his opinion it is liberal to give it an average life of 10 years.

Literature You Should Have

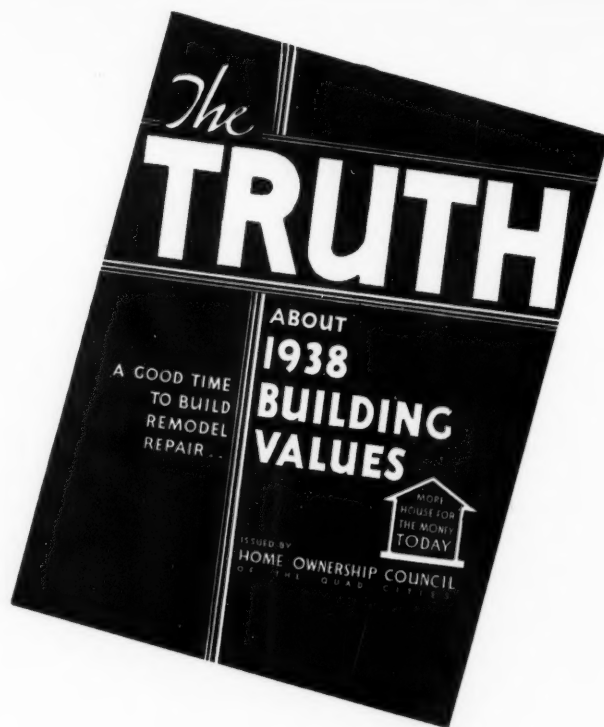
A fairly clear idea of what the FHA thinks about Small Houses may be gathered from its Technical Bulletin No. 4, entitled "Principles of Planning Small Houses," which contains illustrations and suggestive floor plans for the five classes of residential structures. Technical Bulletin No. 6, entitled "Mechanical Equipment for the Home," is especially interesting to industries concerned with Heating, Air Conditioning, Plumbing, and allied equipment and services. Those who wish to study in more detail the Minimum Construction Requirements should apply for the Master Form, Revised March 19, 1938.

But the volume that will have the utmost value to any person concerned with the building industry is the 2,000 page book known as the "Underwriting Manual." This really monumental work embraces every possible factor, large or small, that may enter into the computation of the cost of building any kind of structure. The book constitutes the cornerstone of the whole technical philosophy of the FHA. It gives a picture of the general organization in Washington, and of the various specialized branches of the organization in Washington and in the field. It lays down the principles for procedure under every conceivable circumstance, and it furnishes rules for the solution of almost all problems that will be presented in the course of the work. It is written exactly like a book that is to be used in a class-room, and it contains all the instructions that are given in a class-room, by precept and example. The book is officially known as *FHA Form No. 2049, Revised Feb. 1938*. It may be purchased by sending 75c to the Superintendent of Documents, Washington, D. C.

The Quad Cities Campaign To Prove "Building Costs are NOT too High"

ONE stumbling block to widespread renewal of home construction is the belief that building material costs and building labor costs are so high that people cannot afford to build homes. This belief has tended, in far too many instances, to kill that first enthusiasm for home ownership so necessary for any notable stimulation of building.

Because it is necessary for prospective owners to want a home badly enough to investigate the cost of building or buying, the overcoming of this "costs



are too high" attitude constitutes the major public relations job of the construction industry.

As yet little has been done. The FHA has laid most emphasis upon easy financing and, secondly, on safer financing procedure, but has said little about the cost of building a home. A few business papers (American Builder, as an example) and a few newspapers have launched publicity showing comparative values today and a few years ago, but, generally speaking, the public must yet be sold on the fact that today is a good time to build.

The Quad Cities Campaign

The most comprehensive, cooperative effort to combat "costs are too high" brought to our attention is the Quad Cities campaign. The Quad Cities are Davenport, Iowa; Moline, East Moline and Rock Island, Illinois. The basic aim of the movement is to prove that building materials and labor costs are "not too high" and that equal or more house for the money can be built today than at any time in recent years.

The history of this movement is this:

Earl S. Larson, executive head of the First Federal Savings and Loan Association, started a Moline movement. Lumber dealers and others in the Quad Cities heard of the program and decided that this effort was too important to be confined to one community and developed the idea into the Quad Cities campaign. A larger group was organized to include representatives from the lumber dealers, building and loan associations, sash and door manufacturers, public utilities, department stores, plumbing and heating wholesalers and retailers, contractors of all types, cement manufacturers, labor organizations, abstract and mortgage organizations, architects and others.

A large meeting was held and an executive committee was chosen. This committee made up a list of prospective donors to the fund, of individuals and institutions who would benefit directly or indi-



More House for the Money Today 1938

The SAFEST INVESTMENT IS A NEW HOME

NEVER has improved real estate, compared with other forms of investment, been more favorable. Check this yourself. Can you confidently entrust your dollars to a stock market surrounded by flashing "stop" signals? Do you know of any security investments that are both safe and pay an attractive return? Can you contemplate the possibility of inflation, if, as and when it comes, without realizing that dollars as such will sharply decline in value, and prices, including rents, will soar?

INVEST IN REAL ESTATE

There are many sound reasons why dollars invested in real estate are dollars safely taken care of. Whether you put your money in a new home or the repair, remodeling or maintenance of an existing building, it is in the form of tangible, lasting and usable property UNDER YOUR OWN SIGHT AND CONTROL. If this country is to experience inflation as predicted by numerous authorities, property and goods will become more valuable.

A FAVORABLE TIME TO ACT

Take steps RIGHT NOW if you want and need a new home or have money you wish to invest with safety. 1938 building values and prices are extremely favorable. Find out the cost of a lot and a new home. Then see how easily you can acquire full ownership through low monthly purchase payments made possible by the most liberal financing opportunities this country has ever seen.

GET THE FACTS! Your material dealer, merchant, bank or loan association will gladly give you a FREE copy of "The Truth About 1938 Building Values." Read it and then decide in terms of YOUR BEST INTERESTS.

Copies may also be obtained by writing to:

Home Ownership Council
Box 524 Davenport
Box 409 Rock Island
Box 36 Moline

This FREE Book is YOURS

TRUTH ABOUT 1938 BUILDING VALUES

FINANCE-BUSINESS-LABOR

HOME OWNERSHIP COUNCIL OF THE QUAD CITIES

[illegible]

rectly from a stimulation of home building activity.

Pledge cards bearing an indicated quota providing for payment in three monthly installments were printed, workers were chosen and a drive gotten under way.

The Publicity Program

The Fred A. Hinrichsen advertising agency was selected to plan, create and administer the advertising-publicity program, since Mr. Hinrichsen had a background of ten years' experience in the building material business followed by 15 years of advertising experience which included the writing and editing of several organs dealing with the architectural profession and home building.

The three advertisements on this page and the one on the preceding page are part of the twelve ad series. The appeals used were deliberately chosen to reach every class of prospective builder, to prove that building material and labor costs are "not too high" and that more house for the money is obtainable today than at any time in recent years.

The focal point of the planned campaign is a booklet, "The Truth About 1938 Building Values," backed up with a series of twelve newspaper advertisements. Radio was considered but vetoed because of cost. The complete story of building costs is embodied in the booklet. Each newspaper advertisement presented the same story from different angles.

The conclusions presented in the booklet are based upon the following provable facts:

- "1. Lumber prices are the same now as in 1926.
- "2. Lot prices are considerably less than in 1926.
- "3. Plumbing fixtures are 21.3 per cent less than in 1926.
- "4. Coal stokers and oil burners are less than one-half of what they were in 1926.
- "5. Fewer hours of labor are required than in 1926.
- "6. Electric refrigerators are 36 per cent less than in 1926.
- "7. Plans are better than in 1926 but cost no more.

"8. More materials are pre-fabricated and of better design.

"9. Finance methods of 1938 offer amazing savings and create complete home ownership on purchase payments equal to rent."

The aim of the campaign was to place a booklet in the hands of every prospective home builder. In order to get this distribution, each advertisement carried a post office box number from which a card would bring the booklet. Also, all cooperating members of the campaign have booklets to give away.

The campaign was launched on January 31 and is still under way. The twelve newspaper advertisements ran once a week in four papers until April 30. During the first part of the series, advertisements appeared on Monday on the theory that

Monday papers had less competing news and prospective owners more time to read. Later the appearances in one paper were changed to Sunday.

As stated, the primary purpose of the effort is to prove that building costs are not "too high" today. Nevertheless, permits for home construction show that this change in thought resulted directly in an increase in construction. Permits for January, February, March were well above past years; there was some falling off in April because of local unemployment, but the building year will undoubtedly show increases.

Interesting is the fact that as a result of this effort other communities have adopted a similar program. Burlington, Cedar Rapids and Sioux City, Iowa, have campaigns under way. More than twenty communities have written for information.

A number of communities have found this cooperative effort so necessary for their own lethargic prospects that similar campaigns are now under way. Any individual or group wishing full information on the campaign, cost of booklet, cost of the advertising series, may obtain full data by writing the editors.

THE REAL ANSWER to OLD AGE SECURITY



Planned economy, like charity, should start at home. The individual who would most nearly insure himself of security in old age should so plan his personal affairs that with each passing year he adds to his financial reserves.

"How can I save, with the cost of living what it is, and my wages what they are?"—many might question. We grant that the setting aside of savings is frequently very difficult. It is a fact, however, that any family head who **can** and **does** pay his rent regularly each month **COULD** and **SHOULD** plan toward home ownership. It is easier than most people realize.

BORROW AT LOW INTEREST— PAY LIKE RENT

Never have more liberal financing terms been available to the home owner. All that is required is a lot, a few hundred dollars and a steady job. These reasonable qualifications enable you to build a new home suited to your means and your personal tastes. Then, instead of paying rent each month, year after year, with nothing to show but rent receipts, you make **PURCHASE PAYMENTS THAT ARE THE EQUAL OF RENT** and your equity in the new home increases each month. At the end of the loan period you **completely own your home**—and have an estate that will be a blessing in later years. That's planned economy based on hard, common sense. That's the most practical answer to old age security you'll ever find—a new home built in 1938 when Values are Up and Prices are Down.

**MORE
HOUSE FOR
THE MONEY
TODAY
1938**

Act While You Get The Most Home For The Money

In order to acquaint yourself with present day opportunities which await your decision to build, study the facts about building Values and Prices.

A twelve page booklet "The Truth About 1938 Building Values" has been prepared for your benefit. It shows that you can build a better home today for less cost than you could have built in 1926, all costs considered.

The facts presented in this booklet are authoritative and accurate. Ask your material dealer, merchant, bank or building and loan association for your FREE COPY—or write to:

Home Ownership Council,

P. O. Box 409, Rock Island

P. O. Box 38, Marine

P. O. Box 534, Davenport



It's FREE

Ask for your Copy Today



**HOME OWNERSHIP COUNCIL
OF THE QUAD CITIES**

RENTAL DOLLARS VS. PURCHASE DOLLARS



Not all people realize what they are missing when they pass up the opportunity to end their rental payments in favor of modern home purchase payments.

True, some families are undecided as to the permanence of their residence in our community. Naturally they are renters.

Those who intend to reside here permanently will continue to rent only because they do not appreciate the fundamental and long time difference between Rental Dollars and Purchase Dollars.

Briefly stated, here is the difference—\$28.40 in monthly rent of \$28.40 in home purchase payments over a period of 20 years total \$5,816.00.

The rental dollars are gone with not one penny of savings. The home purchase dollars have completely retired a \$3,000 loan on a \$4,000 property—and, mind you, all taxes and insurance are included in the \$28.40 payment.

MAKE THIS VITAL DECISION NOW

Foresight is better than hindsight on any of the seven days of the week. A little effort spent now in gathering the essential figures about building costs and the working out of a home purchase plan may protect you against looking back some years from now and realizing that you have absolutely nothing to show for a stream of rental dollars that **COULD HAVE BOUGHT A HOME**.

It happens that **RIGHT NOW** is an unusually favorable time to make that vital decision to build that modern new home. Finance terms are liberal and easy to arrange—Values are Up—Prices are Down.

Read this book, It's FREE

We have placed all of the facts, authoritatively, accurately and conveniently in a 12 page booklet, "The Truth About 1938 Building Values." Get a copy from your material dealer, merchant, loan association or bank. Copies may also be obtained by writing to:

Home Ownership Council,
P. O. Box 409, Rock Island
P. O. Box 38, Marine
P. O. Box 534, Davenport



THESE FACTS FAVOR the HOME BUILDER

Lumber mill work and laid flooring are but 22.55% of the entire building cost.

A lumber bill priced today is not one penny more than the same bill priced in 1926.

Plumbing fixture prices are only 75% of what they were in 1926.

Paint has been improved and lasts longer—a source of savings because of less frequent repainting.

Prefabrication of windows, frames, cabinets, insulation and many other building necessities **REQUIRE FAR LESS LABOR**.

Building sites can be purchased at a fraction of the 1926 cost.

Our community is underbuilt and has great future promise so that home investments in the Quad Cities are made **SECURE**.

Homes built today are better in a score of ways than those built in 1926—and at a lesser **TOTAL COST**.

Finance methods of today, at low monthly purchase payments, give you, compared with 1926 finance methods, a saving greater than your lumber bill.

* Experts agree that the normal "home" year 1926 is the fairest year for comparison with 1938 values.



**HOME OWNERSHIP COUNCIL
OF THE QUAD CITIES**



Sioux City, Iowa, Master Warm Air Ass'n Display for Public Education

KEEPING in step with modern merchandising trends, the Master Warm Air Association of Sioux City, Iowa, built the fine display of sheet metal and warm air products shown above in the lobby of the Northwestern Bell Telephone Company.

According to surveys taken, more than 8,500 telephone users visit this room during a single month and most of these users represent owners of heating plants.

The display is composed of automatic controls for stoker firing, oil firing and hand firing; cooling coils; filtered, forced air package units; gas-fired air conditioner; steel and cast furnaces; grills; humidifiers and duct fabrication. The display is sponsored by the following firms: Fred Ebert Plumbing & Heating Co.; Ellis Bourrett; Carlson-Dahlin Hardware Company; Friend-Pike Hardware

Company; Interstate Cornice Works; Ralph Lembecke Company; Morningside Furnace & Tin Shop; Larsen Brothers Company, Inc.; Norfolk Furnace Company; Peterson Metal Products Company; MacFarlane Coal Company; Iowa Foundry Company, and McArthur Sheet Metal Works.

The purpose of the display is to educate the public to protect itself by insisting that the warm air contractor selected for any work be a licensed and bonded contractor. Further, that warm air heating and residential air conditioning is a specialized field containing many special functions and complicated equipment and only the thoroughly versed and experienced contractor can insure a satisfactory installation.

The association through its display also intends to show the many degrees of air conditioning now obtainable and how each degree is obtained from its particular apparatus.

Beginning in this issue we will publish the furnace ordinance of Sioux City, Iowa—a recently enacted code containing the best provisions from other city ordinances. The forced air sections are not segregated, but will be found in chapters of this gravity code.

Sioux City, Iowa, Furnace Ordinance

Be It Ordained by the City Council of the City of Sioux City, Iowa:

This ordinance shall be known and cited as the Furnace Ordinance of Sioux City, Iowa,

Section No. 1—License and Permit Necessary

(a)—No person, firm, partnership or corporation shall install, repair, renew or remodel any warm air heating system, ventilation work or the air distribution system to and from any air conditioning unit or units, in Sioux City, Iowa, without first having obtained a license and a permit for the work to be done from the Building Inspection Department, and said permit must at all times during the construction of such work, and until the completion thereof, be posted in some accessible place in the building in connection with which the work is being done.

(b)—Bond. When the Furnace Inspector is satisfied through oral examination or otherwise as to the applicant's fitness and standing relative to his ability to install a warm air heating system, ventilation work or the air distribution system to and from any air conditioning unit or units according to the requirements of this ordinance and his reliability as to completion of previous work, and his record in connection with proper performance of previous contracts, he shall notify the applicant to file with the City Clerk a surety company bond to be approved by the City Council in the sum of \$2,000.00 in favor of the City of Sioux City. Such bond shall be conditioned on the faithful performance of all duties required by ordinance, rule or regulations of the City of Sioux City, Iowa. It shall be a further condition of said bond that the obligor will hold the City harmless from all damages sustained by reason of neglect or incompetence on the part of any such person, firm, partnership or corporation in the performance of work done.

(c)—License. Upon approval of such bond by the City Council the Furnace Inspector shall issue to the applicant a license for one year, or any part thereof, upon the payment of \$50.00.

(d)—License Expiration. All licenses herein provided for shall expire on the 31st day of March next ensuing after the issuance thereof.

(e)—Renewal of License. Renewal of the license shall be made by the Furnace Inspector upon the payment of \$25.00 in advance on the 1st day of April of each year thereafter.

(f)—Before issuing a permit for the installation, repair, renewal or remodeling of a warm air heating system, the Building Inspector may require plans, specifications, or description of the proposed work, and there shall have been paid into the Department of Buildings the following permit fees:

All furnace resets or regasketing jobs shall be inspected and a fee of \$1.00 be assessed.

All replacement of firepots or major repairs shall be inspected and a fee of \$1.00 be assessed.

All air conditioning jobs shall be inspected and a fee of \$1.00 be assessed (private dwellings).

All heating unit replacements installed shall be inspected and a fee of \$1.50 be assessed.

All new furnace installations shall be inspected and a fee of \$2.50 be assessed.

All automatic inducto draft control shall be inspected and a fee of \$1.00 be assessed.

All furnaces in which oil burners are installed be inspected for safety and health and a fee of \$1.00 be assessed.

All furnaces in which gas conversions are installed be inspected for safety and health and a fee of \$1.00 be assessed.

All furnaces in which stokers are installed be inspected for safety and health and a fee of \$1.00 be assessed.

All sulphur tests when made for examination of leaks, \$1.00.

All blower and air conditioning jobs shall be governed by the current issue of the American Society of Heating and Ventilating Engineers' Guide.

The Furnace Inspector may upon proper evidence of improper performance of contracts, improper workmanship and failure to comply with the requirements of this ordinance or continued departure from the procedure herein required refuse permits applied for or revoke permits issued.

The Furnace Inspector or his authorized assistants shall have the right during reasonable hours to enter any building, basement, manhole, subway or premises in the discharge of his duties or for the purpose of making any inspections or tests of any heating apparatus or parts thereof properly coming under regulation of this ordinance. He shall have power to make arrests for violations of any of the provisions of this ordinance and to compel the suspension of any furnace or heating work being done or attempted in conflict with the provisions and spirit of this ordinance.

The Furnace Inspector may suspend or interfere with any heating installation, replacement or repair which may conflict with the City Ordinance and the laws of the State of Iowa relative to proper Fire Protection and Health regulations; including requirements as to ventilation, humidity and sanitation.

SECTION NO. 2—

All Ordinances or parts of ordinances in conflict herewith and especially Ordinance No. P-11611 are hereby repealed.

SECTION NO. 3—

This Ordinance being deemed urgent and necessary for the preservation of public peace, health and safety shall be in full force and effect from and after its passage, approval and publication as provided by law.

Read first time February 19th, 1937.

Read second time February 26th, 1937.

Rules suspended and read third time February 26th, 1937.

Passed and Approved February 26th, 1937.

W. D. HAYES,
Mayor.

Attest:

EDGAR V. MOONE,
City Clerk.

Furnaces

SECTION 2. (a) Where a building is to be heated with warm air, the party installing heating apparatus in said building shall furnish to the Building Inspector, the name of the furnace to be used, series number, a statement of the square feet of exposed radiating surface above the fire pot contained in such furnace, also details of construction and such other information as may be necessary to determine the capacity of the apparatus, including the net cross section of free air passage between the exposed radiating surface over which the air supply flows and the outer jacket or casing.

(b) No furnace shall be installed which does not contain at least one square foot of exposed radiating surface above the fire pot for each five hundred (500) cubic feet of contents, and at least one square foot of free air passage for each three thousand (3,000) cubic feet of contents of the building to be heated.

Casings

SECTION 3. (a) Warm air furnaces shall be enclosed in metal casings or walls of bricks, tile or concrete.

(b) Portable sheet metal casings, including casing tops, shall be made of galvanized sheets not lighter than 26 U. S. Standard Gauge. They shall fit the castings and casing rings closely, so as to be dust tight, and shall be securely fastened to the front. The casing shall be lined from the upper casing ring to a line on a level with the grate. Such lining shall be not less than one inch from the outer casing, and shall have a free air passage both at top and bottom. A corrugated lining may be used, but the corrugations shall be not less than one inch deep.

(c) When side collars are used the casing top must be of

sufficient height so that the largest warm air pipe can be taken from side without ovaling. In no case shall a distance less than eight (8) inches be maintained between the top of any furnace and the outside edge of casing or bonnet.

(d) Any furnace, the casing top of which shall come within sixteen (16) inches of a combustible floor, ceiling, or joists, shall be protected by a sheet metal shield extending not less than eighteen (18) inches in all directions beyond the casing of such furnace. The shield shall be suspended at least two inches below the woodwork, allowing free air space between shield and woodwork.

No furnace casing or top coming nearer than six (6) inches of ceiling or joists shall be allowed in any case.

(e) Openings for side casing collars shall be cut into the casing top so that the tops of all openings are on a level. All casing collars shall be fitted into place so as to make a dust tight joint. All collars shall be of 26 gauge galvanized iron and shall be of same size as the warm air pipe to which they are connected.

(f) Brick, cement or hollow tile casings shall be constructed as follows: Walls shall be not less than eight (8) inches in thickness and shall be constructed air tight. Rectangular casings shall be constructed with least inside dimension the same as that of the portable casing of a corresponding size of furnace. Walls shall be carried the same heights as portable walls, allowing not less than eight (8) inches between the top of furnace and the bottom of top cover. After placing the collars for the warm air pipes, continue the masonry up even with the top of the collars, lay spacing rods of bar iron on edge, or angle irons across the furnace top, cover these with sheet iron, cover the sheet iron with masonry and run the inside walls four (4) inches above the masonry bed. A galvanized iron casing bonnet may be used on brick-set furnaces.

Provision shall be made in the walls for a man-hole to give ingress to heater chamber.

(g) Pipeless or one-pipe furnaces having but one duplex grate for the discharge of warm air, and return supply of cold air, in which the cold air supply passes down on the outside of the warm air chamber, need not have the warm and cold air chambers separated by more than one thickness of sheet metal, which may be constructed of black or galvanized iron not lighter than No. 26 U. S. Standard Gauge.

The outer casing shall be constructed of galvanized iron not lighter than No. 26 U. S. Standard Gauge, and a uniform air space shall be maintained at all points between the inner and outer casing.

In no case shall the top casings of such furnaces be allowed nearer than twenty-four (24) inches to any combustible ceiling or joists above the furnace.

Basement Warm Air Pipes

SECTION 4. (a) All warm air pipes in the basement shall be made of bright tin not lighter than I. C. or galvanized iron.

Side seams shall be locked seams, and all joints shall be double seamed or lapped not less than one and one-quarter ($1\frac{1}{4}$) inches, and such joints shall be beaded and soldered or riveted. All pipes shall be properly secured to the ceiling or joists above. No soldered or riveted joint will be required where the round pipe slips over the casing collar. All warm air pipes shall have an upward pitch toward the register of not less than one (1) inch per foot of length.

Warm air pipes twelve (12) inches or more in diameter shall be made of material not lighter than IX tin or No. 26 U. S. Standard Gauge galvanized iron.

(b) No warm air pipe within eight (8) feet of the furnace, except when doubled, shall be placed within two (2) inches of any woodwork or other combustible material unless such woodwork or combustible materials are covered with asbestos paper, covered with tin or iron, with an air space of one (1) inch between the metal and wood.

(c) All warm air pipes in the basement shall be provided with dampers placed not more than two (2) feet from the furnace casing.

Provided, however, that no damper will be allowed in the warm air passage of single pipe furnaces

(d) Where warm air pipes pass through masonry walls they shall be protected with metal thimbles placed in the wall in the proper position to maintain a true alignment, and give free movement to the pipe without reducing the area or shape of the same and so as to give one inch air space on all sides between thimble and pipe.

Stacks and Risers

SECTION 5. (a) All warm air pipes, stacks, heads, elbows, tees, angles and fittings of all kinds connecting the warm air pipes in the basement to stacks and outlets shall be made of bright tin not lighter than I. C., and shall be made double from and including the boot or foot piece in the basement, to the top of each and every stack and register on all floors throughout the building.

Register boxes, if lined with tin, may have the outer covering of cast iron or galvanized iron or sheet metal of not less than No. 28 U. S. Standard Gauge.

Provided, however, where the movement of the warm air through pipes and stacks is accelerated by the use of a fan, the ducts and stacks may be made of galvanized iron and need not be made double.

(b) There shall be maintained continuous uniform air space between the inner and outer walls of such pipes, stacks, fittings, elbows and foot pieces of not less than five-sixteenth ($\frac{5}{16}$) of an inch where the same are required to be made double.

(c) All pipes, stacks and fittings, including boots and register boxes, shall be one of the several makes accepted by the National Board of Fire Underwriters, or their equal, as determined and approved by the Building Inspector.

(d) All pipes and fittings shall be securely fastened in place by means of lugs secured to the outer walls of the same, and the various members shall be so made that all joints are locked or riveted and the several members shall be attached to each other through slip joints which are suitable for the purpose intended, and when properly connected they shall be air-tight.

(e) No pipe or fittings will be permitted on the work which depends entirely on soldered joints, and no nail or other fastening shall be driven through the pipe into studding or other support.

Warm Air Registers

SECTION 6. (a) When base-board or wall registers are used, they shall be properly connected to the stack head in such a manner as to prevent any leakage of air between the stack head and register.

(b) Floor registers shall be provided with a register border or double register box with five-sixteenths ($\frac{5}{16}$) of an inch air space between outer and inner boxes.

Where the register is set directly over the furnace the woodwork shall be protected with heavy asbestos paper covered with tin.

(c) Registers for warm air and warm air pipes shall not be located in the outside walls, but shall be located in or near the inside walls in all cases.

(d) In no case shall floor registers be allowed in the floors of any theater.

(e) Registers may be provided with valves or dampers for closing the same except where there are no more than two (2) registers on the system, then at least one of the registers shall be without valve or shutter whereby it might be closed.

[To be continued]

We have published during the last two years heating ordinances from Minneapolis, Minn.; Ft. Wayne, Ind.; Dayton, Ohio; Toledo, Ohio. Instructions for obtaining all these ordinances can be had by writing the editors, except for Ft. Wayne, where all copies are exhausted.



Installed several years ago this downspouting shows the appearance today of "pioneer" installations. All the parts shown were hand-made in the shop, and installed three years ago in a Butler, Pa., home. Compare with later installations shown in the other photographs.

Chromium Nickel Stainless Steel for Drainage Systems

STAINLESS steel, to the average sheet metal contractor, means a highly polished surface, great resistance to abrasion and corrosion, lustrous appearance, sanitation and negative reaction to acids, alkalis and chemicals.

From an application standpoint, stainless steel is commonly associated with hotel and restaurant equipment, chemical and industrial processing equipment, lustrous trim for inside or outside architectural work.

Unpolished Stainless Steel

These uses, generally speaking, require highly polished surfaces. But there is another type of stainless steel—unpolished stainless—which possesses the characteristics of durability and strength; resistance to corrosion, weldability, long life but, not carrying the production cost of the long, tedious, polishing operations which cannot be skimmed or slighted where a polished surface is specified, is lower in cost.

Unpolished stainless steel already has many applications—in chemical and textile industries; in combination with highly polished stainless as a color contrast in decoration; but a new use which should be popular with home owners is for house drainage systems and products.

Unpolished for Drainage Systems

Stainless steel sheets of 28 gauge, unpolished, is suggested for drainage equipment. This gauge of stainless steel has forming qualities comparable to galvanized iron or 16-ounce copper along with a high degree of strength and corrosion resistance.

Contractors who have used stainless steel for drainage work report that these lighter gauges can be worked easily, formed by customary and standard practices and equipment and are particularly

Right—An installation of ogee gutter made in the shop and downspouts, all of durable stainless steel. The joints are riveted with stainless rivets and soldered.

Left—The flashing is also made of stainless. All photographs supplied by The American Rolling Mill Co., Middletown, Ohio.

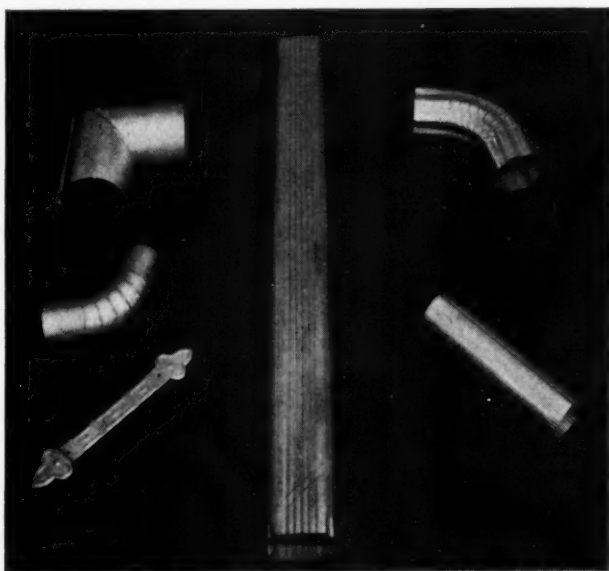


suited to localities where industrial or saline atmospheres exist.

Unpolished stainless does not have the brightness of the polished sheet, but for house drainage systems this soft finish may be a decided advantage as a color contrast to the other materials of the building. Standard drainage products—downspouts, elbows, mitres, eaves trough—are standard production items.

For the contractor who wishes to fabricate his own items the following procedures are suggested.

Keep the sheets as clean as possible, and wipe all work surfaces and tools free of dirt before using. After soldering, wash well with a 5% to 10% solution of washing soda followed by a water rinse.



Typical stainless steel accessories for a roof drainage job: a mitre, elbows, an ornamental hanger and two kinds of conductor pipe.

Non-acid powder cleaners such as Dutch Cleanser or Bab-O are recommended for cleaning the material. Do not use metal wire brushes unless they are of stainless steel.

Soldering Suggestions

In soldering it is best to use a high tin content solder, such as 70-30, as it melts at a lower temperature and greatly minimizes danger of heat tinting of the stainless. It also gives a stronger joint with a better color. However, 50-50 solder can be used, successfully.

Several good stainless steel soldering fluxes are available, but uncut muriatic acid is generally satisfactory, mixed with an equal amount of cut acid.

It is preferable to use stainless steel accessories, such as cleats, rivets and nails, and thus avoid contact with dissimilar metals which may cause galvanic corrosion, or discoloration of the stainless steel due to rusting of the ordinary steel accessories.

Expansion and Contraction

Expansion and contraction of this metal ordinarily is no problem, though normal precautions should be taken. Assuming that installations would be subject to no more than a 100° temperature change, any 10' dimension would be subject to a change of .113" from one extreme of temperature to the other. As a matter of comparison, in galvanized steel this figure would be .079". Slight danger of cracking exists, however, because of the material's high strength and fatigue resistance. Allowance for expansion should be of the same order as for copper.

All decks, roofs and gutter linings should be laid on dry felt or paper.

Resistance Welding [Part 6]

By L. H. Frost

Welding Engineer
Electric Controller & Mfg. Co., Cleveland

Alloys Present Special Problems

THE welding of certain alloys has long been somewhat of a problem so far as most users of resistance welding are concerned. Many alloys can be satisfactorily welded, but in general it requires more careful control than the welding of clean, mild steel.

The first consideration in welding an alloy is its electrical resistance. If the alloy has a low electrical resistance, high currents must be used in order to develop the necessary heat between the contacting surfaces. It is known that copper will be the most difficult metal to weld since the heat generated will be divided equally between the three surfaces in contact—namely, the surfaces between the sheets, and the two outer surfaces where they contact the electrodes.

The second consideration is that many of the alloys have a very narrow plastic range. This means that too much heat will cause the metal to flow while welding and in some cases will burn holes through the work, and another symptom is the welding of the electrodes to the work. Obviously too little current will not produce any weld, since the material will not reach the plastic range necessary for forging. Depending on the thermal conductivity or capacity of the material to carry away heat, too little current will not produce a weld regardless of the length of time the current is applied. Thus it is evident that careful control of current and time is required when welding alloys.

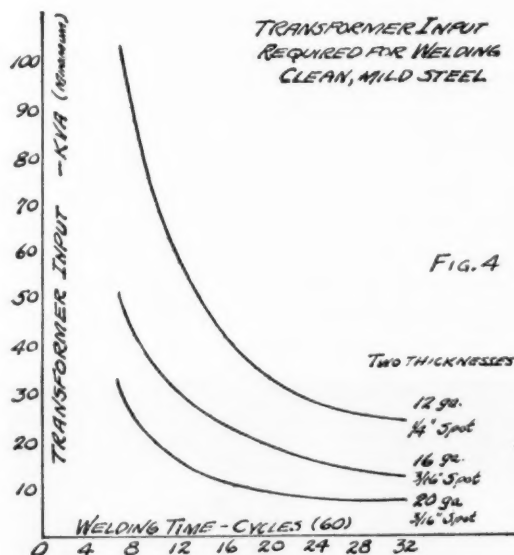
The more wide-spread use of alloy materials brought into prominence the need of careful timing of current application. This need was met by a number of timing controls which are often used as adjuncts to the existing welding equipment. Thus it is possible to equip most machines with a suitable control which will eliminate the need of careful judgment on the part of the operator. This is particularly important in alloy welding since there is seldom any surface discoloration or evidence of heat while welding. If heat is noticeable, it is usually too late to obtain a good weld, and thus the operator can only guess at the proper time of current application.

It is not possible to apply a timing control as a cure-all. If the welding machine has insufficient current capacity to weld the material under manual control, it will be impossible for the timer to do

what the welding machine is incapable of doing. The function of the timing control is to make duplicate welds. This function it performs faithfully and some controls are so designed that they will produce uniform welds even under varying current conditions.

Welding Brasses or Copper Alloys

The copper alloys were probably the first metals other than steel to be welded in quantity production. Of these it was found that the yellow brasses were easily welded by machines of sufficient capacity. The red brasses are difficult to weld because of their high electrical and thermal conductivity. Considerable research has been carried on by one of the large copper and brass companies looking toward improving the weld-ability of copper alloys. This



work has resulted in several alloys which not only have desirable resistance-welding characteristics but also greater strength than pure copper. The alloying elements used are zinc, manganese, silicon, nickel, beryllium, aluminum and tin. Sufficient information is not yet available to prepare complete curves of transformer capacity required for the various gauges of these alloys, but at this time experience indicates that transformer capacities of about four times the values for steel are required.

Too much care cannot be taken to insure obtaining proper electrode pressure. In order to obtain the most from a transformer of given capacity, it is necessary to use somewhat less pressure than for

*Reprinted by permission of The Welding Engineer, Chicago, and the author from a series of articles—"Theory and Application of Resistance Welding."

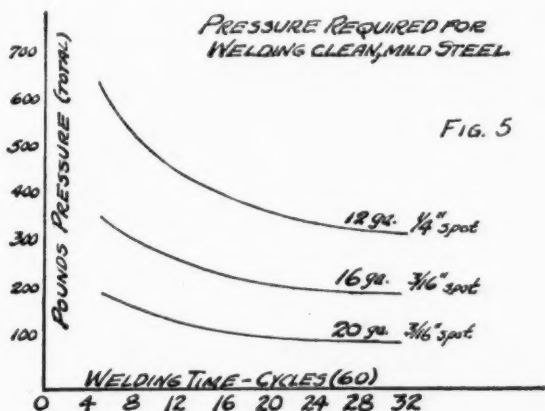
welding steel. It is important that this pressure be effective throughout the entire welding period because of the narrow plastic range and the short welding period. In other words, the pressure must be uniform as the electrodes sink into the work while welding.

Air-operated machines are well suited to this work, but they should be adjusted to avoid hammering the electrode on the work and causing indentation or "brinelling" prior to welding. Many older types of machines have so much friction in sliding heads and guides as to prevent maintaining proper pressure during welding; with machines of this type, erratic results will be obtained.

In general, short welding periods of 2 to 8 cycles, based on 60-cycle current, are most desirable. The spherical- or ball-end electrodes prove most satisfactory. Hard alloy electrode material may be used, depending on the alloy being welded, but in all cases the electrode alloy with the highest electrical conductivity should be used.

Ball-End Electrode for Aluminum

Aluminum and its alloys have become of increasing importance since the advent of all-metal aircraft which use the strong aluminum alloys to lessen weight. In aircraft work there are many who prefer to rely on riveted structures due to lack



of confidence in the resistance-welding process. Aluminum is being spot welded successfully in quantity production, but satisfactory results require the use of machines specially designed for this work. The welding characteristics of aluminum are similar to those of the copper alloys.

Transformer capacities approximately five times those for steel, as given in Fig. 4 are required.

The spherical- or ball-end electrodes are necessary, but a modified form having a 7° angle has been found very satisfactory and is more easily dressed in a lathe than the ball end. If proper relationships of current, pressure and time are not maintained, unsatisfactory results will be obtained. It is important to properly dress the electrodes at regular intervals or they will "pick up" the aluminum, as it is essentially a soft material.

It is very important to maintain proper welding periods, or the surface of the weld will be burned

and the electrode surfaces destroyed. Time values required range from 1 cycle for 22-gauge to 12 cycles for 1/8-in. material, based on 60-cycle current.

The welding machine may be of essentially the same design as for copper alloys, but of slightly higher transformer rating.

Stainless Steel Easy to Weld

The group of alloys known as the stainless steels have probably received more widespread comment than any of the other alloys. Various conflicting ideas have been expressed regarding the spot welding of this material, and there is considerable doubt regarding the corrosion-resistant properties of the material after welding.

Ordinary 18-8 stainless steel itself is one of the easiest metals to weld. The electrical resistance of the material is high and the thermal conductivity low. The plastic range is rather broad, which gives the metal very desirable characteristics from the resistance-welding standpoint. The one difficulty is that when the metal is heated to approximately 1500° F. and allowed to remain at that temperature for a relatively short time (say, 1/2 second) the chromium precipitates as chromium carbide, and in such state the metal has lost most of its corrosion-resistant properties. This condition can exist when spot welding, but with reasonable care it can be easily avoided by using water-cooled electrode tips, so constructed that the outer surface of the weld can be maintained at a temperature below the critical point. Further, by the proper control of current and time the thickness of the metal affected by the welding operation may be controlled. Transformer capacities approximately 1/3 of those given in Fig. 4 will be required, with pressures equal to those given in Fig. 5. Time periods range from 2 cycles for 0.010-in. sheets to 20 cycles for 1/8-in. sheets.

At present, a U. S. Navy specification calls for a satisfactory stainless-steel weld to have a penetration or thickness of from 50% to 80% of the thickness of both sheets. To determine this, sample welds are made. The weld is then cut through the center and filed smooth. The cut surface is then polished with aluminum oxide or some other very fine polishing compound. To make visible the penetration, it should be placed in a solution of 2 parts glycerin, 2 parts HCl and 1 part HNO₃ and the solution heated to 140° F. After a few minutes the sample may be removed, washed and dried, and the weld metal will be visible.

A brown stain will often appear on the surface of the weld. If this stain takes the form of a ring, it is not precipitated chromium carbide, but is only an oxide which may be buffed off without destroying the corrosion-resistant properties of the weld.

As discussed under chromium-plated sheets, it is not possible to weld highly polished stainless steel without distorting the surface. By the use of the flat electrode previously mentioned, it is possible to minimize this distortion, but due to the contraction

(Continued on page 78)

The front of the building extends for several hundred feet along a newly widened approach street. The two main entrances with marquee are flanked by ornamented aluminum windows and spandrels.



The Newark, N. J. Station

NEWARK, N. J., last summer witnessed the completion of the new Pennsylvania railroad passenger station consisting of a new station, six platforms, three vertical lift bridges, a large express building and the widening of streets serving the station. From a construction standpoint, one of the interesting features of the new station is the extensive use of aluminum for ornamentation, protection and permanence at low maintenance cost.

The main station building is trimmed inside and out with aluminum of rolled and extruded forms. As shown in the photographs the window mullions are extruded aluminum shapes; the window sash are also aluminum and the spandrels are composed of ornamental aluminum castings as shown. Over each main entrance there is a large and elaborate marquee of cast and extruded aluminum as shown in the details of the metal work. Inside the building practically all trim is satin finished aluminum. Of considerable interest are the platform waiting rooms, shown in the photographs, constructed of rolled and extruded aluminum.

Two metal contractors handled the work. They were C. E. Halback and Co. of Brooklyn and General Bronze Corp. of New York. General Bronze made three marquee; Halback one; General Bronze had part of the inside work and the window mullions and spandrels; Halback had the platform waiting rooms, much of the outside protective metal work and some inside work.

All store fronts, both inside and out and the ticket window in the

concourse were by Halback.

The two large marquee are identical in design and construction. As shown in the details, the structural frame was so constructed that the metal trim could be hung and fastened in place on hangers and angle iron as shown. Both sheet and extruded metal were used and all ironwork supporting the aluminum was specified hot galvanized. The fabrication and erection procedure was practically identical with both contractors.

The marquee was assembled completely in the shop in three sections; then taken apart and moved to the job for final erection. A detail shows the erection order followed by Halback—beginning with the central panel of the soffit; then working in to the building; then out to the front; with borders erected last. In erecting the soffit the panels were first erected on the hangers, the beams (as shown in the drawing) were then placed in position and last the ribs were put in place. The borders were placed after this and the ornamentation applied as shown.

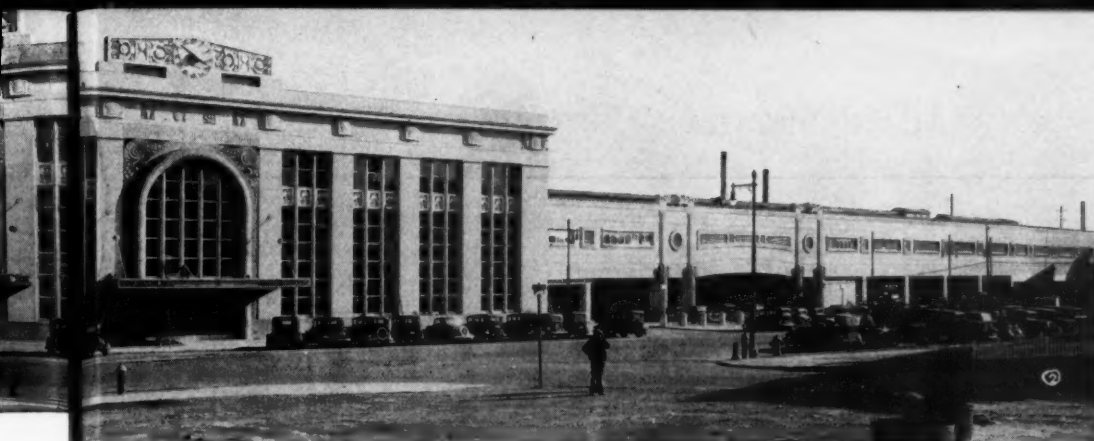
The end and front elevations were changed some-



Above—One of the features is the cast and extruded aluminum platform waiting rooms. The details of design and application of the aluminum sections are shown on one of the following pages.

Left—Looking down one of the train shed wings showing the built-up roof and two types of metal skylights.





The station has two entrances at the front and two wings—hence, this is not a reversed duplicate of the photograph on the facing page, but shows the right wing.

what in the final design in order that the ornamentation might consist of standard extruded shapes rather than special items. The final finished elevation appears in the photographs. Wall flashing for the marquee is lead coated copper while the roof plates are copper bearing steel.

Platform Waiting Rooms

The waiting rooms on train platforms are interesting for the use of rolled aluminum sections. The details show application of these rolled plates which were furnished the Halback company by Aluminum Company of America to exact size and marked for location. The Halback company then punched and drilled the plates for application to the frame. The final satin finish of the aluminum was also applied by Halback using abrasives and buffers.



Above—Closeup of entrance and marquee, constructed and ornamented as shown in one of the following pages of details. An enlarged detail of a window and its spandrels appears to the right.

Right—Every precaution was taken to insure long, maintenance-free construction. An example—the complete through wall and parapet flashing as used on all parapet walls and on bases of skylights.

The details show where the panels were installed and the type of joints used to join plate sections. These plates and joints are standard items with sizes variable. The details also show how the plates are fastened to the framing. The fluted corners are extruded sections assembled as shown in the details.

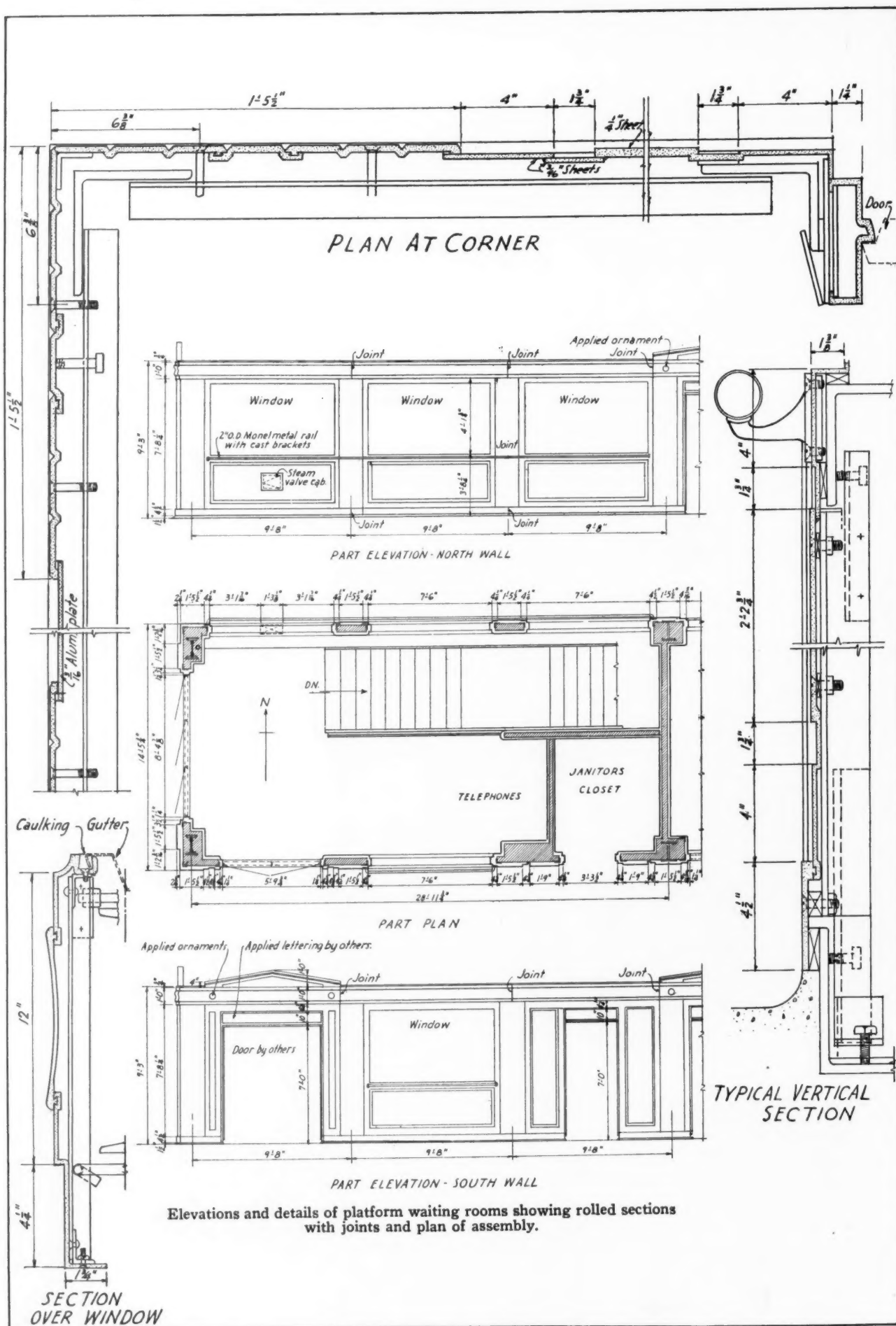
In addition to these applications of metal, there was installed for water protection many hundreds of feet of wall flashing where the built up roofs over train platforms abut parapets or building walls. Two of the photographs show these applications. These same pictures also show some of the skylights of two general types—one incorporating a ventilating monitor surmounts the platforms; the

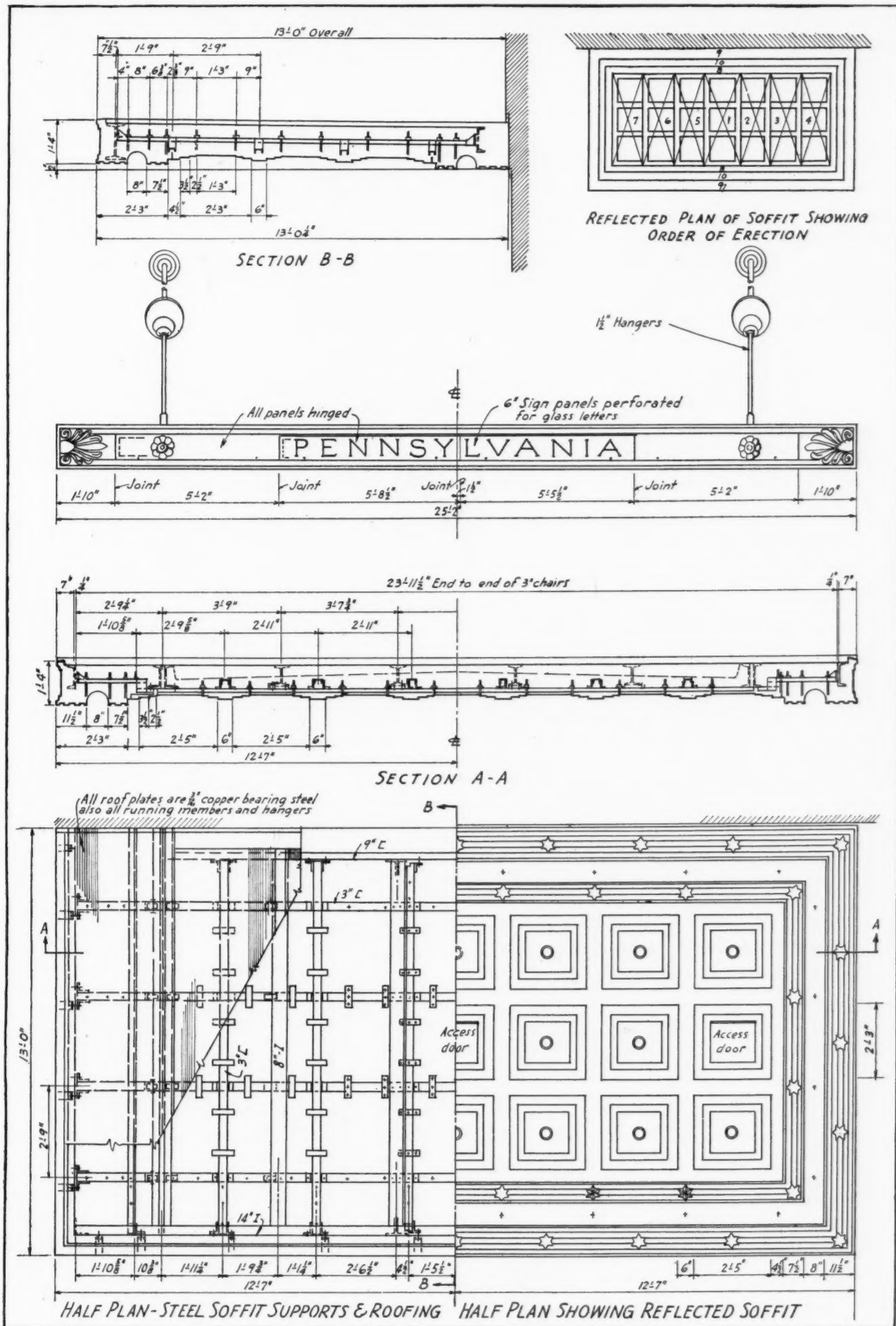
second is a plain, pitched skylight over the tracks. The skylight bases required sheet flashing as shown in the photographs. The material used for flashings is copper.

In addition to the architectural metal contractors named, the general building contractor on the station building and platforms was George A. Fuller Company, New York. Architects for the project were McKim, Mead and White, New York. For the railroad company, T. J. Skillman and W. D. Wiggins were chief engineers; A. C. Watson, chief engineer of the New York zone; T. W. Pinard, engineer bridges and buildings, New York zone; L. P. Struble, engineer, Newark improvements.

[See next two pages for details]









Materials for Ducts Subject to Corrosion

By C. C. Hermann, Philadelphia

SHEET metal duct work and stacks subject to corrosion encounter reduced useful life to an astonishing degree. For short periods of usefulness, where the installation will in all probabilities be removed after a few years, ordinary low priced materials will be satisfactory; however, for systems designed to be used for many years it is well to look into the higher grade of materials of construction. First cost is an important factor in any installation, but replacement cost is likewise important and should receive consideration.

For a given installation in which ordinary tank steel or an annealed sheet is contemplated, it is well to consider the fact that, due to moisture, the presence of corrosive acids, etc. there will be a given amount of corrosion take place. By using chrome-nickel sheet in place of the annealed sheet the life of the installation will be multiplied by ten. The cost of material and fabrication may be approximately seven times more, so that the over all cost will be 70 per cent of the cost for the cheaper material. In other words, a duct system constructed of chrome-nickel steel will cost, on the basis of useful life, approximately 0.7 as much as ordinary black iron.

The next best material is copper bearing steel, however, this material will not usually prove economical in the presence of corrosive gases. For a given condition, copper bearing steel will have a life of from $1\frac{1}{2}$ to 2 times that of black iron and costs about 10 per cent more than black iron construction. Copper bearing steel construction will have an over-all cost of 55 per cent that of black iron.

Other materials such as chrome-iron alloy, copper alloy, nickel alloy and vitreous enamel, fall be-

tween black iron and chrome-nickel steel, although vitreous enamel steel is now being produced which possesses the possibility of being a more economical material than even chrome-nickel in some installations where the corrosive acid is particularly bad (as an example, very dilute sulphuric acid). The principal objection to coated sheets has been due to temperature checks in the coating which allows the acid to attack the underlying metal.

The maximum economy in the use of alloy sheets is obtained by paying attention to design. Much thinner material may be used and the use of steel reinforcing on the outside (away from the acid or corrosive agent) to provide the necessary stiffness tends to reduce the first cost. Where 10 and 12-gauge black iron is used a 16-gauge chrome-nickel sheet with properly designed reinforcing will prove economical and practical.

Fig. 1 illustrates how reinforcing may be applied to very thin piping for horizontal installation. In this design the 14-inch diameter pipe is constructed of 24-gauge chrome-nickel steel which does not possess sufficient mechanical strength to be self supporting with the possibilities of internal loading. A pipe supporting cradle is constructed of light angles having a curved connecting element spaced at 6-foot intervals and with hanger rods from each angle to overhead structure. The thin wall pipe is then laid in the cradle.

Fig. 2 shows a method used for supporting vertical runs of piping. This consists of light angles used as struts between the flanges of the pipe sections. A steel band is placed around the angles and the pipe at 6 to 8-foot intervals. The sections are assembled with the stiffeners on the ground and then raised into place. The supporting steel is not secured to the pipe permanently in either case.

38

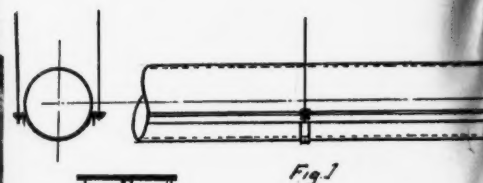


Fig. 1



Fig. 2

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Fig. 2

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RESIDENTIAL AIR CONDITIONING SECTION

THE problem of heating the low cost house now so much in the public eye, for a price within the generally allotted seven to ten per cent of the construction cost of the house, seemingly calls for somewhat different apparatus and design.

In this section we present a group study of several low cost house heating systems—some have basements; others no basement. Some of the systems are automatically fired; others use hand-fired coal. Some houses use a gravity system; others forced air. Some houses have attic space through which pipes can be run; others require complete concealment. Some systems are so compact that metal work is practically absent; others have quite sizeable metal contracts.

In most examples the installed cost is given. These costs, coupled with a study of the plans, will, it is hoped, serve as a reference library of current thought on this interesting subject.



Wheels...

THAT CARRY A COUNTRY

★Without steel you would spend your life cooped up in some small community, and a ten-mile journey would be a rare adventure. This country of ours would still be largely wilderness. Comforts we take as a matter of course would be unheard-of luxuries.

It is no coincidence that America consumes more steel per person than any other nation--and has the highest standard of living. *Steel* makes possible our modern life and its multiple comforts.

Companies which create the faster and more accurate machinery, faster and more dependable transportation, stronger and more lasting construction--these are the companies *we* serve. Thousands of these companies depend on Youngstown, because they know that Youngstown is constantly at work in research, to find steels best suited for their needs.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - - YOUNGSTOWN, OHIO

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin
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Spikes.

25-7A



YOUNGSTOWN

Blow Down Furnace in the Attic



FROM Vandalia, Missouri, comes a really unusual heating system in a low cost house—a one story, basementless building with the furnace in the attic!

As the isometric plan shows, all the supply ducts are likewise in the attic and the warm air is taken off the bottom of the furnace propelled by a blower in the top of the casing.

The return system maintains the unusualness by gathering the cold air from the rooms into a galvanized iron duct system underneath the floor, sucks the air up into the attic and into the top of the furnace casing.

The installer—American Furnace Co., St. Louis, reports that this is only one of many systems installed in basementless, low cost houses. They suggest—"We have found it best to carry our air distribution system through the attic (where there is no basement) to wall stacks that are installed in the partition with the register just above the base-

board. We have discouraged the idea of discharging the warm air through a plenum containing registers above the breathing line due to the cold floor characteristics of the basementless house.

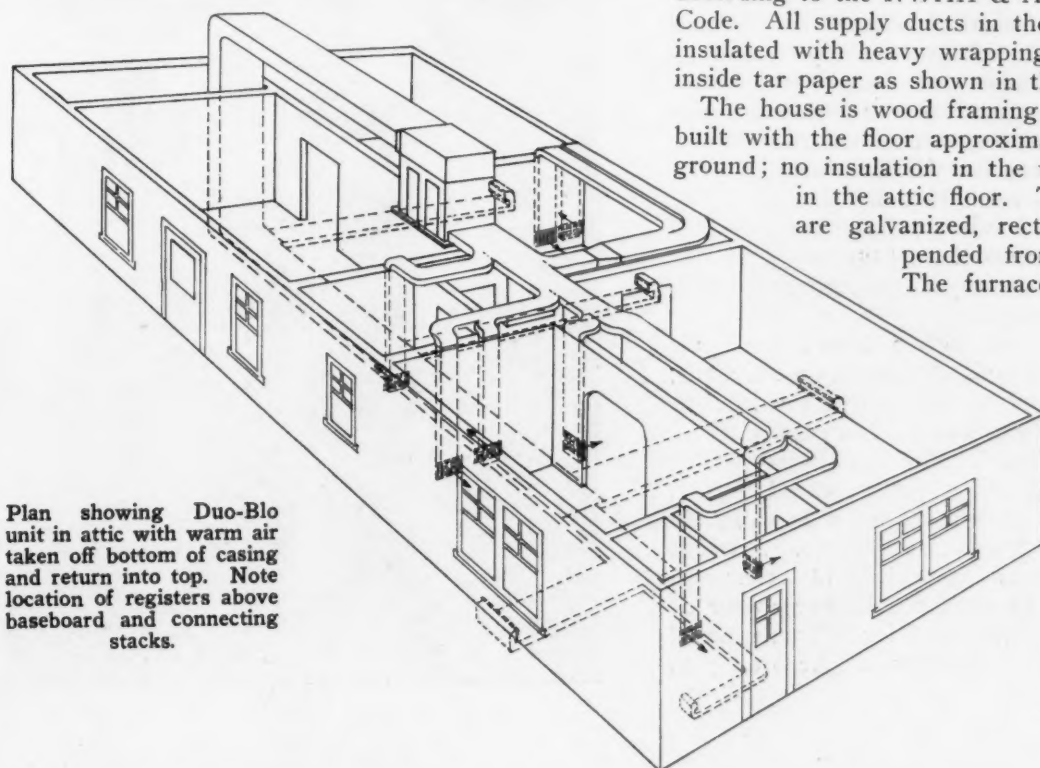
"We take our return air from as many rooms as the price will permit, and always through a grille at a center point along the baseboard of an outside wall. This return air is carried back to the blower through a tight system to avoid leakage and an unbalanced return distribution. Should the unit be installed in a heater room, it is very necessary that the return system be tightly connected to the blower and it is good practice to admit some air into this room from the system to insure a supply of air for combustion.

The system illustrated is based upon a zero degree to 70 temperature difference. The heat loss is 107,000 Btu per hour. The register air temperature averages 135 degrees by test, requiring 1310 cfm from the 1400 cfm blower. All ducts are sized according to the NWAH & AC Ass'n Mechanical Code. All supply ducts in the unheated attic are insulated with heavy wrappings of rock wool tied inside tar paper as shown in the photograph.

The house is wood framing and wood exterior, built with the floor approximately 3 feet off the ground; no insulation in the walls; no insulation in the attic floor. The return air runs are galvanized, rectangular ducts, suspended from the floor joists.

The furnace is gas fired, controlled by a thermostat in the living room (fan controlled from a bonnet switch) and has a capacity of 105,600 Btu per hour at the bonnet.

The installed price of the system is not available.



Plan showing Duo-Blo unit in attic with warm air taken off bottom of casing and return into top. Note location of registers above baseboard and connecting stacks.



Cost Analysis of a Basementless System

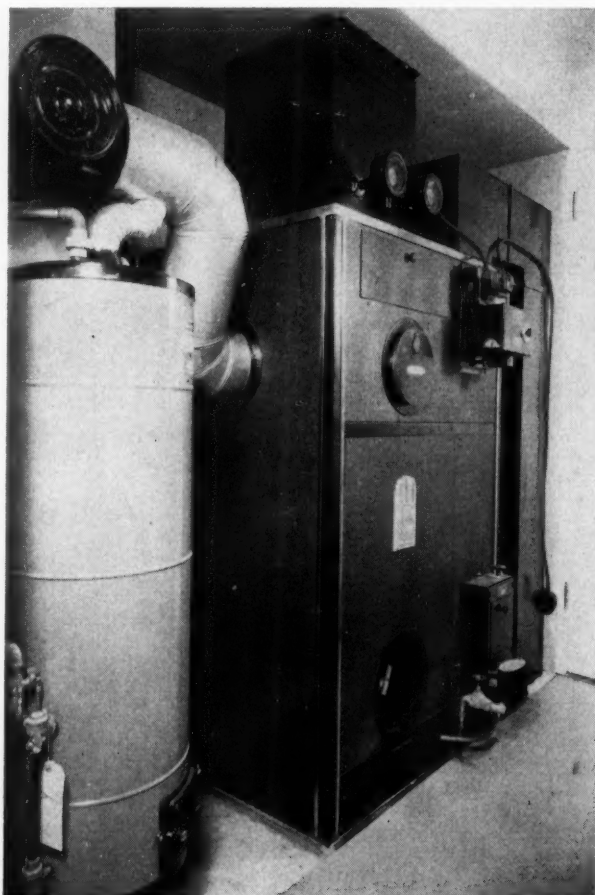
AT Lafayette, Indiana, The Purdue Housing Research Project has made some notable contributions to the advancement of low cost housing. The Housing Research Campus comprises 143 acres of land, a portion of which has been improved and contains five houses. Requirements of the houses are: Cost not to exceed \$5,000; a different basic type of construction and plan to be used for each house; accommodations to be for a family with two children; to include a garage.

Probably the most important contribution from the Project is the exact and minutely complete cost records maintained and released. Among the houses is House No. 1—two story; rooms as shown on the floor plans; no basement; wood studs with stucco exterior and interior surfaces of plywood nailed to the studs, stud spaces completely filled with rock wool insulation; first floor of 5 inches of gravel, 3-inch concrete slab, 2 inches of slab insulation, wood blocks laid in mastic. The second floor has a plywood ceiling for the first floor; 2 by 8 joists; $\frac{3}{4}$ -inch sub floors; $\frac{1}{2}$ -inch oak floor. The roof is flat—plywood ceiling; 2 by 8 joists; $3\frac{1}{2}$ inches of rock wool insulation, 1 by 8-inch sheathing; three ply, built up, 10-year guarantee roof with galvanized iron flashing.

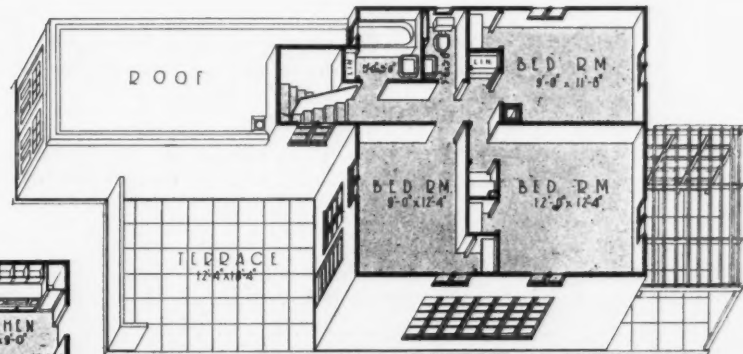
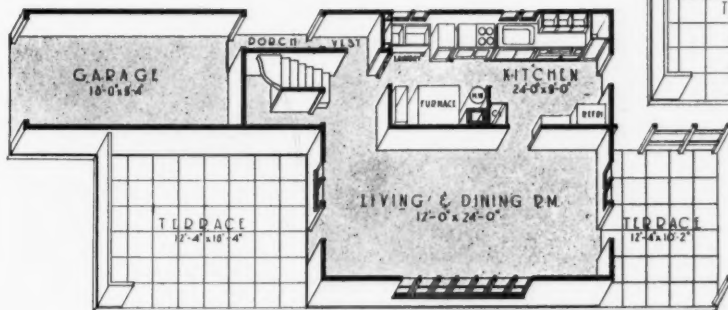
This house is heated with a forced warm air furnace using oil as a fuel. As shown on the plans, the furnace is located in one end of the kitchen and is not completely closed off from the kitchen. The equipment is described by the Project—"The unit encloses a vaporizing, pot type, oil burner, motor and fan, steel wool filters and a drip and pan type humidifier. Two automatic Mercoid switches regulate the fuel flow and control the blower motor. A separate switch to start the blower motor at high or low speed is provided for recirculation of air during summer temperatures. According to

the manufacturer's data the unit has a heating capacity of 85,000 Btu."

The operation of the heating system is described by the Project—"When the air is heated it passes up to a plenum chamber built of asbestos board beneath the ceiling. Galvanized iron ducts of 26 gauge, 4 by 12 inches and 8 by 12 inches placed



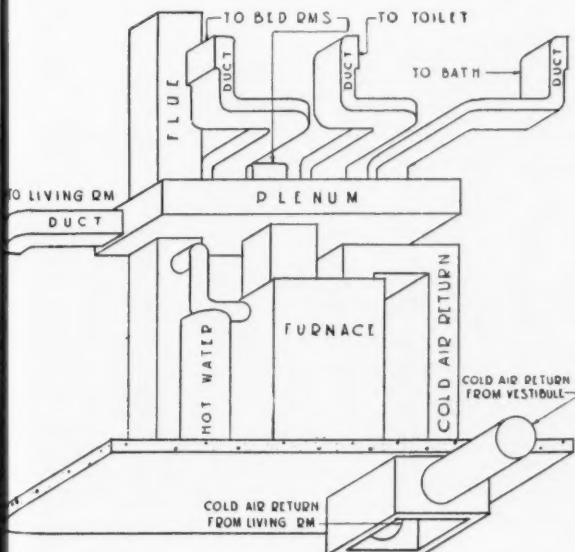
1—The photographs opposite show the exterior of the stucco house and the Superflex (Perfection Stove Co., Cleveland) furnace with riser. The isometric drawing shows the flat plenum and return air system with compact warm and return piping. The floor plans show the utility room.



between parallel joists conduct the air from the top of the plenum chamber to each room. Louvre type registers control the flow of air from these ducts. These registers are located near the ceiling of the first story and near the floor in the second story. The length of the longest duct is about 8 feet. In all there are only 32 lineal feet of duct work."

Since return systems are considered important in houses of this type the return system is described—"Cold air returns are 15-inch sewer tile laid with cemented joints and running from a concrete pit near the location of the furnace to two concrete pits beneath floor registers. These registers are of the fixed grille type. One is located under the large bank of windows in the living room and the other in the kitchen vestibule."

As stated detailed costs were kept. The costs for the heating system are shown in tabular form.



Breakdown of Labor Cost

Item	Operation	Labor	Total Hours	Wage	Job Cost	Sub Total	Total
Flue	Laying Masonry	Mason	8	\$ 0.75	\$ 6.00		
	Mixing & Hod	Mason's Helper	8	.50	4.00	\$ 10.00	
Return Ducts	Excavation	Common	2½	.60	1.50		
	Concrete Pits	Carpenter	14½		7.90		
	Laying Tile	Common	8½	.50	4.25		
	G. I. Duct Work	Skilled	6	.60	3.60	17.25	
Furnace	Installation	Skilled	25	.60	15.00		
	Fuel Tank Installation	Mixed	8	.50	4.00	19.00	
Hot Air Ducts	Installation	Skilled	32	.60	19.20		
	Plenum Chamber	Carpenter	5		3.45	22.65	\$ 68.90

Breakdown of Material Cost

Item	Operation	Material	Quantity	Cost	Job Cost	Sub Total	Total
Flue	Masonry	Com. brick No. 2	590	\$10.35			
		Flue Lining 8"x8"	20 lin. ft.	5.50			
		Prepared mortar	4 sacks	2.60			
		Sand No. 3	600 lb.	.65		\$19.10	
Return Ducts	Masonry	Sewer tile 15"	7 pcs.	11.20			
		Cement	2½ sacks	1.75			
		Sand No. 3	800 lb.	.40	\$13.35		
	Registers	Cold air reg. 18"x18"	2		5.30		
Furnace	Ducts	Galv. Iron—26 gauge			4.50	\$23.15	
	Oil Fired Warm Air	Complete			214.00		
	Fuel Tank	Complete	200 gal.		12.20	226.20	
Hot-Air Ducts	Fittings	26 gauge galv. stacks	32 lin. ft.				
		Reg. boxes 8"x12"	5 pcs.				
		Elbows, etc.	16 pcs.		22.35		
	Registers	8"x12"	8 pcs.		12.05		
	Plenum Chamber	Asbestos board	35 sq. ft.		3.50	37.90	\$306.35

Construction Cost Summary

Item	Operation	Labor	Material	Labor & Material	Profit & Overhead	Sub Total	Total Cost	Per Cent of Cost
Flue		\$10.00	\$19.10	\$29.10		\$29.10		
Return Ducts		17.25	23.15	40.40	\$10.10	50.50		
Furnace & Tank		19.00	226.20	245.20	95.40	340.60		
Hot Air Ducts	Plenum & Ductwork	22.65	37.90	60.55	40.30	100.85	\$521.05	10.7

Round Pipe Attic Supply With Concrete Trench Return

THE brick veneer, one story residence of Mr. and Mrs. Ludwig Pfluegel in Lannon, Wisconsin, is modern in its compactness, room usage and application of materials and equipment, but conservative in its architectural design. The walls are brick veneer with a full stud space of insulation; the roof is pitched with an insulated attic floor. There is no basement—the concrete slab is placed on a heavy cinder fill for insulating purposes.

The total heat loss of the house, based upon minus ten to 70 degrees, is 46,726 Btu per hour. This requires 851 cfm at an average register air temperature of 122 degrees.

The Supply System

The heating system installed consists of a Mueller coal furnace, hand-fired, with attached blower filter unit as shown in the detail. The warm air supply plan consists of a straight rectangular plenum extending above the attic floor, a transition piece and a round pipe distributing system running direct to stacks. The round pipe branches connect into wall stacks which drop down the partitions to the registers which are 12 inches below the finished ceiling.

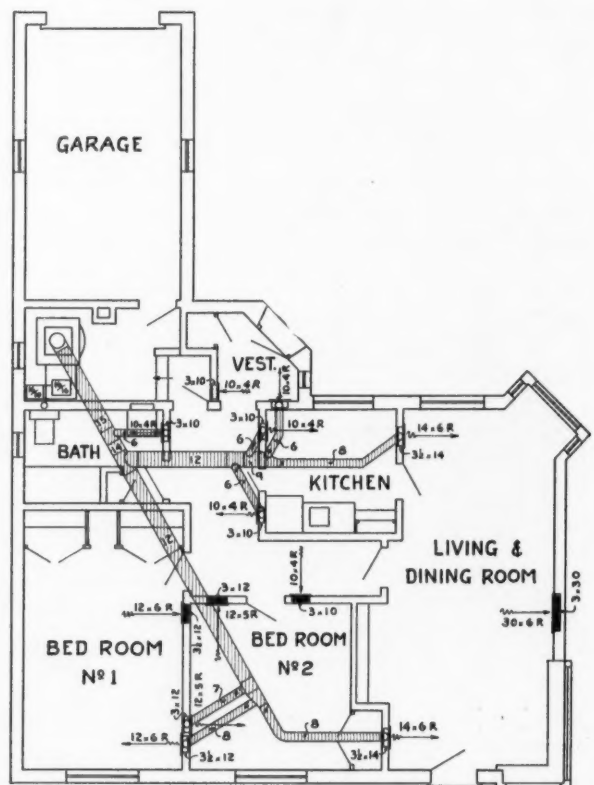
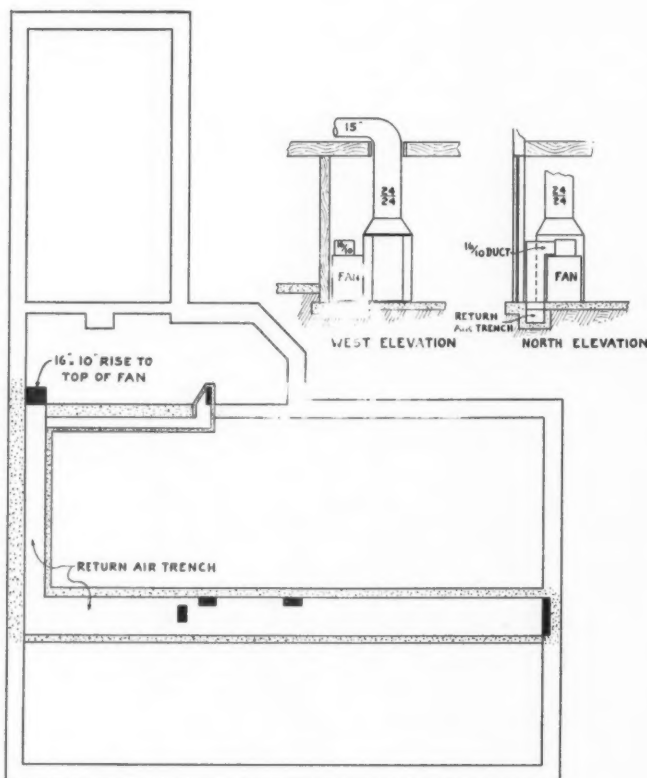
All round pipe branches and mains are sized according to the pressure drop method with supplementary branch pipe dampers for shutting off any one room. The round pipes in the attic are insulated with 1 inch of air cell. All registers are in inside walls close to outside walls to sweep glass and wall with a blanket of warm air.

The Return System

This house has no basement. Neither is there any space between the concrete slab and the earth. To get air back to the furnace, a concrete trench system, as shown, was incorporated in the work of the floor contractor. This is a full trench with monolithic sides and bottom. Air is returned from all rooms excepting kitchen and bath. The details show how the connection between trench and blower cabinet is made. All return air grilles are in the baseboard at the floor.

The installed price of this heating system was \$435. If gas had been used with a gas furnace the price would have been about \$75 greater.

A. F. Caesar of Menomonee Falls was the heating contractor.





Drop Ceiling System

RECENTLY completed in Des Moines, Iowa, for the owner, the charming small house shown in the photograph and drawing and designed by Architect Donald McLennan, Des Moines, has an exterior wall of 8-inch red cedar siding, vapor-seal sheathing, 4-inch studs, rock lath and plaster. The ceiling construction is plaster, rock lath and $3\frac{3}{8}$ -inches rock wool insulation, except the living room, which has the same insulation above Celotex blocks. The floor is carpeted in all rooms except kitchen and bath (linoleum) on 1-inch vapor seal sheathing on a 4-inch concrete slab. Below the concrete is a compacted 6-inch layer of sand.

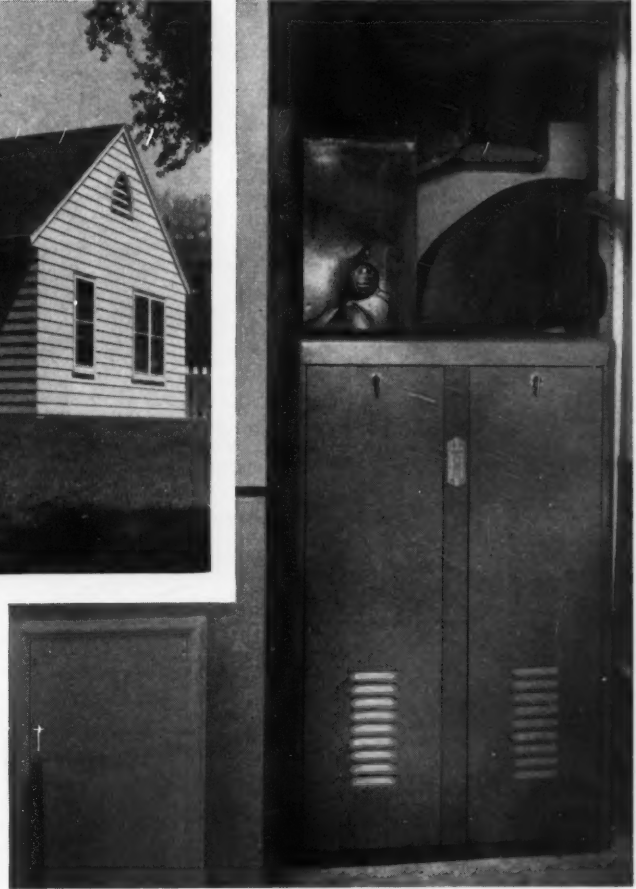
The winter air conditioning system is so compact and well planned that no run of pipe is exposed nor is any of the piping in the attic space. The furnace is Green Colonial gas fired, with the blower and filters in the same casing.

From the straight up plenum two main ducts serve all rooms. One duct goes to the garage with branches along the run for two-thirds of the living room, the kitchen and the laundry. The second duct enters the hall, splits two ways; one branch serves one-third of the living room and a bed room, the other two bedrooms.

Duct number 1 is exposed through the laundry, is furred for a beam effect through the kitchen and is concealed behind the fire place wall in the living room. The ceiling of the hall through which the second duct runs is dropped so that all pipes are behind the ceiling. No duct insulation is used.

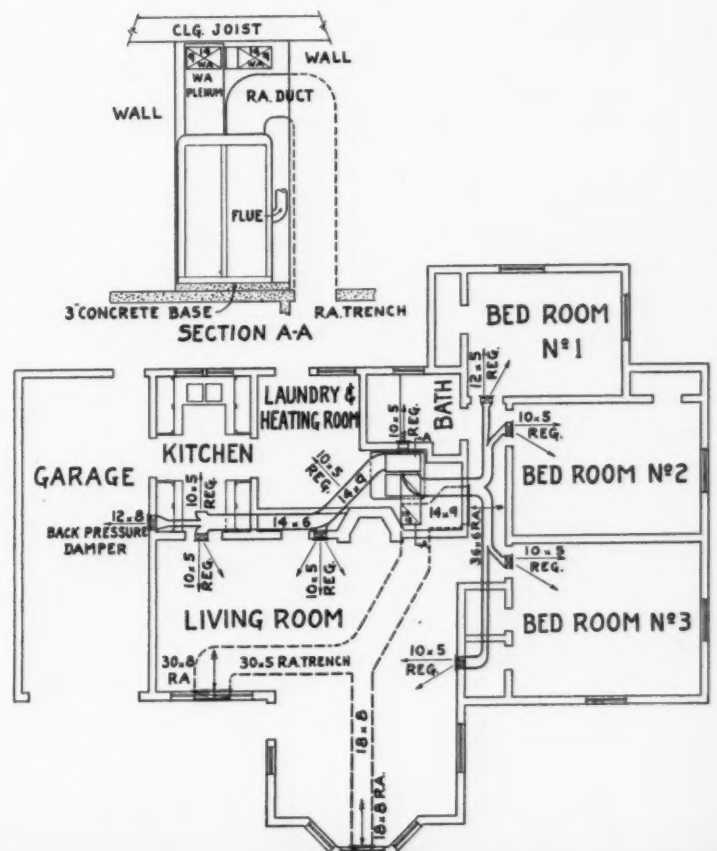
All registers are located 6 feet 6 inches above the floor. All returns are in the baseboard.

Return air is gathered from the living room and



hall only. Trenches beneath the floor consist of a concrete slab bottom with cinder concrete block sides. The trenches come together under the heater room and a U-shaped, galvanized, duct brings the air up and into the top of the casing as shown in the photograph and detail.

(Continued on page 78)





Two-Story, Basementless, Modern House

IN Toledo, Ohio, a considerable number of low cost houses have been built. Materials and types vary, but most of the houses have one feature in common—no basement. Further, the majority have flat roofs and are built of masonry. The Schmidlin Brothers Heating Co., of Toledo, has installed heating systems in many of these houses. As a result of their experience, the members of the firm are definite in their recommendation—"watch the floors for drafts or cold materials from contact with the earth."

A typical heating plan for a typical house is shown. The photographs show one side of a street lined on both sides with houses nearly identical with the single house photographed. This typical house (like those in the row pictured) is built of 8-inch cinder concrete block. The outside finish is paint, sprayed on. The inside surface is a thin building board held to the cinder block with a mastic and finished with emulsified paint.

The first floor is a concrete slab on cinder fill. It should be stated here, however, that the Schmidlin firm has found houses where there is no fill and these floors are impossible to heat in protracted cold weather. The second floor and flat roof are wood joists with sub floor and finished wood floor or a built up roof.

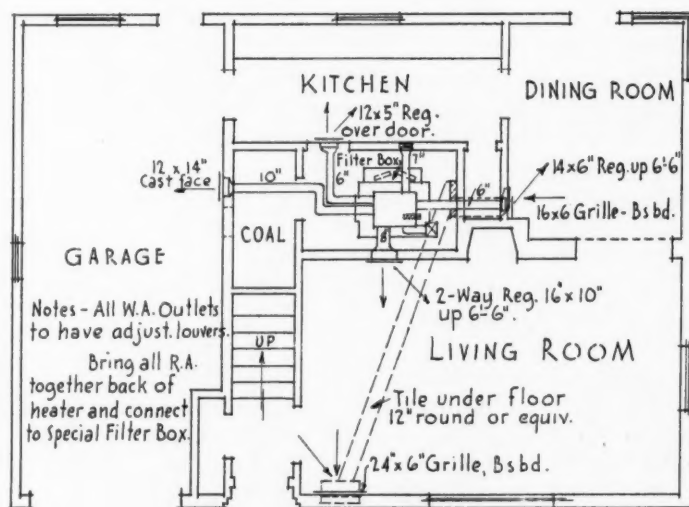
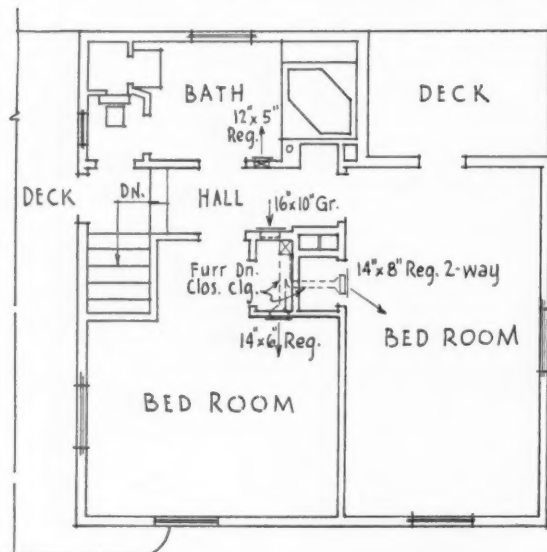
The return system is composed of flue tile laid

with cemented joints before the floor slab is poured. The general contractor laid the tile. Since this first floor slab is placed before the heating system can be moved in, the Schmidlin mechanics furnished special galvanized iron boxes for the return grilles and the connection to the fan; these were spotted and the concrete poured around with the slab.

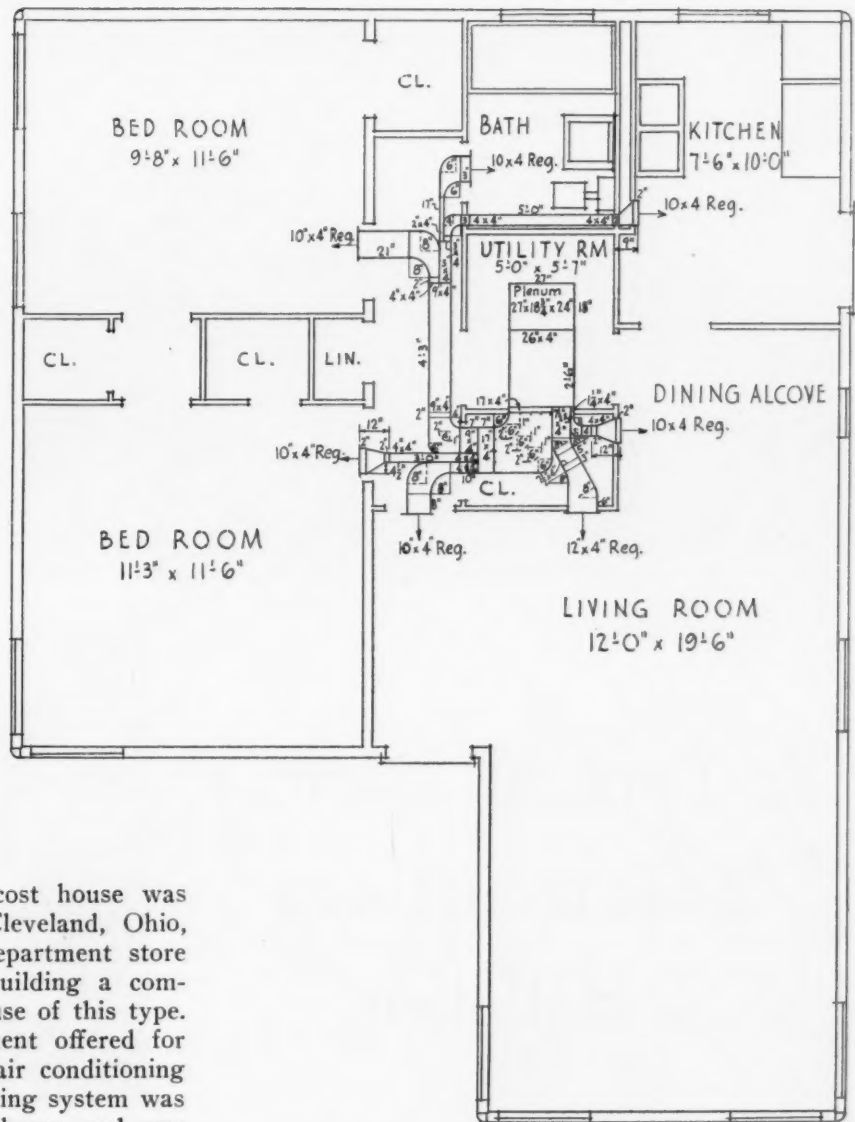
The warm air supply system is compact and confined largely to the heater room. All supplies are round pipe, as shown, connecting with directional flow registers located 6 feet 6 inches above the floor. To heat the second floor a riser off a stub duct is carried up through a bed room closet as shown to heat the two bed rooms. A single riser is carried straight up from the bonnet to supply the second floor hall. A third, single, riser is taken up the hall partition for the bath room. The two branches to the bed rooms are furred behind the closet ceilings.

The heating plant is a hand fired, double drum, steel furnace without any radiator, but extra high in the drum. To this is attached the blower with a special filter box as shown in order that the equipment could be placed in the narrow heater room. The capacity of the blower is 1,000 cfm.

This house sold for \$6,500, which is the price for most of the two-story houses shown in the group. The installed price of the heating system, including all apparatus, was just over \$400.



Low Cost House Displayed within a Department Store



A MODERN type, low cost house was opened to public inspection in Cleveland, Ohio, when the Wm. Taylor & Son department store erected within their downtown building a completely furnished and equipped house of this type. An important part of the equipment offered for public inspection was the winter air conditioning system in full operation. This heating system was designed by the architect of the house and was installed by the Mannen & Roth Co., Cleveland sheet metal contractors.

Although this house was erected indoors, its patented design and use of materials was developed by a home building company interested in advancing the cause of low cost housing. The house as erected in the department store was identical with houses built outdoors excepting that the house floor was laid on the department store floor and not on cinder fill.

The Heating System

The plan shows that the automatic gas furnace is located in a utility room, and for air supply employs one large warm air duct split into branches as shown. Outside the utility room the warm air ducts are concealed behind a dropped ceiling in the closet and the hall. The system is so compact that all the ducts are carried in the hall and closet, excepting the kitchen supply which is furred through the bath room in a beam effect.

In this installation all return runs were eliminated; air is returned to the utility room which acts as a large return air plenum. Grilles in the two utility room doors let the air in. Bed room

and bath doors were cut off 1½ inches above the floor; the other doors are arched. It is contractor Mannen's opinion that this same type of return would work equally well if the house was outdoors, but a compact return system with return grilles located beneath supplies (where supplies are in the wall) could be built. In such a case the utility room could again be used as a plenum or the returns could be piped directly to the blower. The additional cost of a closed return system would be \$40 to \$60.

Operating Details

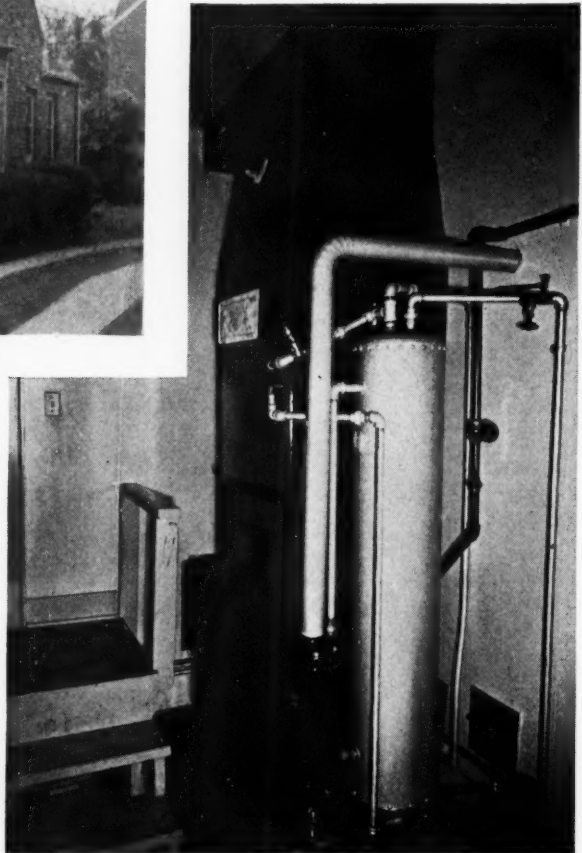
On the supply side the fan circulates approximately 700 cfm. The register air temperature is 150 degrees at register velocities from 500 to 600 fpm. All registers are 6 inches below the ceiling or about 7 feet above the floor. Supply ducts are designed to equal friction at approximately 800 fpm velocity.

The cost of the heating system, including the automatic gas furnace and duct work figured on a poundage basis was approximately \$350. This does not include plumbing or electrical work.



Typical Detroit houses show good architecture, substantial materials; this house is basementless. The gas fired heating plant in the restricted utility room is shown below.

A Typical Detroit Basementless Installation



IN DETROIT there has been a volume of low cost housing under way for several years. According to the Detroit office of F. H. A., the house without a basement is not especially popular—about one house out of fifty being so built. The other 49 houses are low cost, but have a basement. Due to the volume of construction under way, however, about 20 basementless houses are being built each month, so the problems of design reach several contractors every month.

The Woodson Heating Company of Detroit has installed heating systems in both basementless and basement houses and includes in its list of installations some unusually interesting projects. From the projects completed, Jim Woodson, head of firm, selected the basementless house shown in the photographs and drawing as interesting, but typical.

This house is very much like houses built and under construction in the Detroit area. The characteristics of these houses are—one story or $1\frac{1}{2}$ stories; good architecture; good materials; sold partially unfinished (see later text); heated with a mechanical warm air system, using some form of automatic heat.

This house was built to sell for \$4,950 on the

purchaser's lot. The data sheet shows the outside wall to consist of $\frac{1}{2}$ -inch fibreboard, Rocklath, air space, $\frac{1}{2}$ -inch Balsam Wool blanket, sheathing, paper, brick. The heat loss coefficient for this wall is .15. The coefficient used to calculate the floor loss is .34 using a temperature below the floor of 35 degrees. Heat loss is based on minus 10 degrees to 70 for all rooms except bath, which is 80 degrees. The attic, as explained later, is not heated or finished so an attic temperature of 10 degrees is used to figure the heat loss of the ceiling. The total heat loss of the house is 61,517 Btu. per hour.

The data and heat loss sheets were calculated from the new Technical Code, however, in this installation, because the runs are short, no correction for actual register temperature was made; the average register temperature of 145 degrees was used to size pipes.

The photographs show inside views of the fibre-board wall with blocked board ceilings and registers above the breathing level. The plan shows the location of rooms and runs of pipe, with the return system below the floor. Some of these warm air runs are interesting from the question of how the contractor worked the pipes into place.

How System Operates

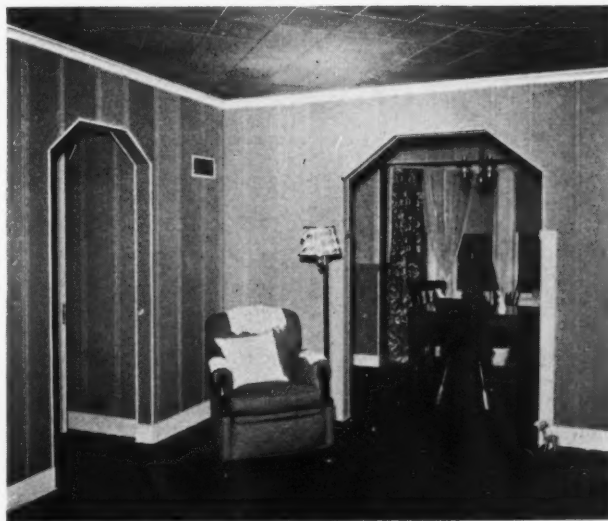
In explanation of the installation Mr. Woodson says:

"This is one type of house built in Detroit without basement. It is easily heated without having to spoil the valuable space in the attic by having pipes exposed. This was done by dropping the ceiling in the hall 12 inches and a portion of the kitchen ceiling over the stove 4 inches. We were able to conceal all of the supply pipe in the space provided, the returns being out of sight under the floor.

"The heater is a Woodson No. 11 Gas Fired Air Conditioning Unit with blower, motor, filters and gas controls under the heat exchanger to conserve space. Provision is made for blower to operate intermittently in mild weather and continuously in severe weather. The unit has an input of 90,000 Btu. per hour.

"The heating cost of this house, per season of 6,496 degree days, has been approximately \$70.00 with gas for heating purposes priced at \$.32 per D.G.U. (Detroit Gas Unit) which is an amount of gas containing 530,000 Btu. or equal in heat content to 1,000 cubic foot of manufactured gas containing 530 Btu. per cubic foot.

"The entire second floor is unfinished except that it is floored with shiplap, to be used only as storage



The living room shows a warm air register about level with the top of the doorway. The plan below shows how pipes are run between joists and behind dropped ceilings thus using no second floor space.

space and to hang laundry to dry when weather outdoors is unsuitable. No provision is made for heating in future, and heater would have to be larger to heat additional rooms.

How Pipes Are Concealed

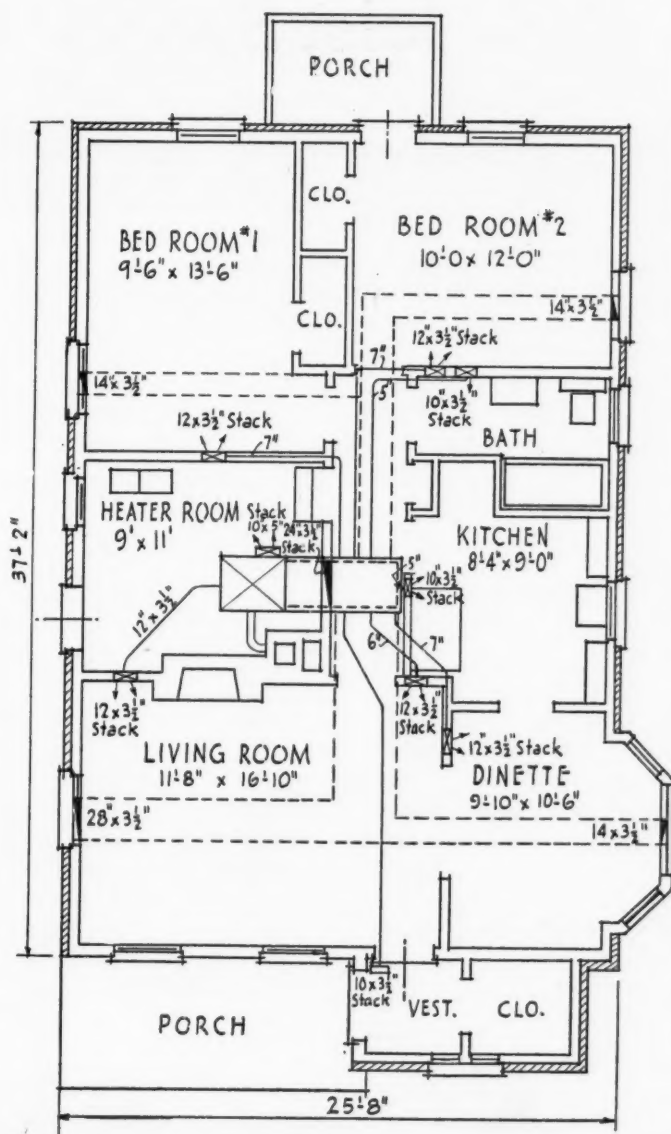
"To clear up method of concealing warm air supplies I must first explain some of the construction details. The first floor joists all run crosswise of the building and are supported on the two outside foundation walls and on a center footing running from front to back. The second floor joists run crosswise of the building, except those over living room, dinette and vestibule which run from front to back. These joists rest on plates which are on top of the studs. This leaves an opening $7\frac{1}{2} \times 14$ inches in between the ceiling joists which is completely above the partitions and ceiling through which we were able to run round galvanized pipes to transitions connecting to rectangular drops which connect to register boxes provided with tight fitting damper that can be set for balancing when register face is off. (The Balsam Wool Blanket was applied over the pipes before the attic floor was laid).

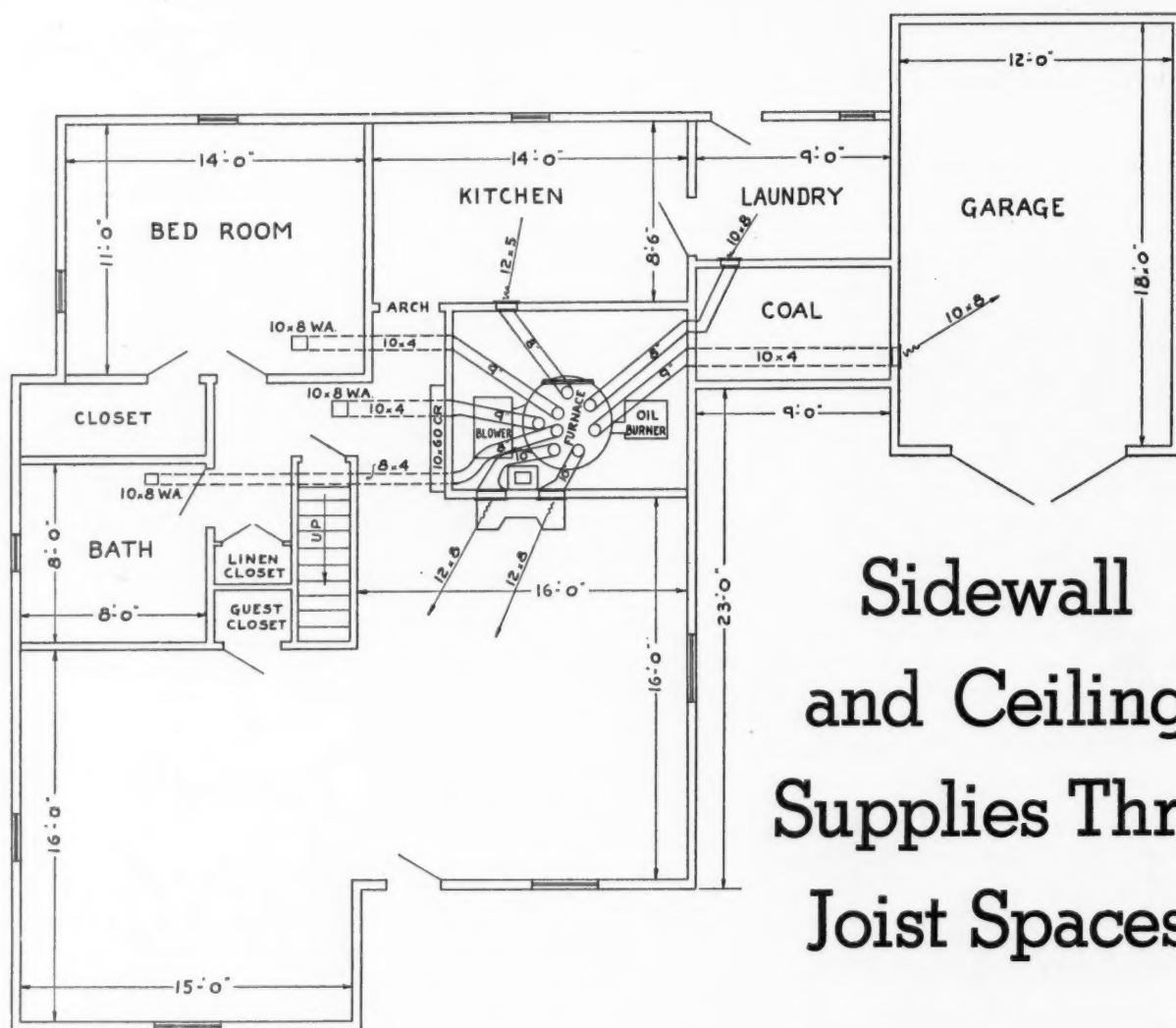
"The horizontal runs are actually between second floor joists above partitions. The only warm air supply not connected in this manner is one to the living room which is connected with a $12 \times 3\frac{1}{2}$ -inch rectangular galvanized duct which crosses under heater room ceiling.

"Joist spaces were boxed for cold air returns from outside walls to center and connected by rectangular galvanized duct under the joists, there being a space between the ground and bottom of floor joists of about 18 inches.

"This job installs complete for \$385.00.

"I might add that in this particular plan access to attic is gained by means of a stairway in heater room which goes up over laundry tubs."





Sidewall and Ceiling Supplies Thru Joist Spaces

THE heating system in the home of W. R. Dahne, in Luckey, Ohio, shown on the plan above, is an interesting example of a combination design devised specifically to meet certain requirements of room arrangement and usage. The house, costing approximately \$6,000, is one-story, has no basement, garage is attached and heated and the furnace room is approximately in the center of the floor plan.

The system shown was designed by Henry C. Bitter of Toledo. The system takes advantage of several standard methods of air distribution and includes a single, large return air grille which, according to tests, does not result in floor drafts or cold floors.

The house is so constructed that the floor is about 30 inches off the ground excepting the utility room which is at grade level. The warm air supply system consists of round pipes running directly to registers a few inches below the ceiling or round pipes through the joist spaces and connecting to registers in the ceiling.

The critical area is the living room, which, as shown in the plan, is two large 16-foot squares, offset. To heat this room two registers are placed in the fire place breast and the air is directed toward cold walls and windows by directional flow faces. To heat the garage, kitchen and laundry, round pipes are run through the utility and coal rooms to side wall registers.

However, to heat the bath, bed room and upstairs room it was necessary to conceal the pipes so joist spaces were used as shown. The total heat loss of this house is 90,000 Btu, including the garage. The oil fired furnace and blower deliver just over 1,300 cfm at about 138 degrees register air temperature. The average velocity of air issuing from the warm air registers is 450 fpm; the velocity at the return air grille is about 332 fpm.

The system was checked for operating results a short time ago and the results are tabulated.

Room	Btu Loss	Calculated cfm	Cfm Being Delivered
Living	36,707	477	524
Bath (70°) ..	5,440	71	110
Bed Room ...	10,472	137	160
Kitchen	8,160	106	130
Laundry	9,520	124	130
Garage (40°) .	10,300	133	130
Upper Room .	10,880	141	136
	91,479	1,189	1,320

The heating system was installed for \$592 including the oil burner, blower, furnace, accessories, material tax and cartage, since the house is outside Toledo.

First Low Cost House In Mississippi

IN Jackson, Mississippi, there is nearing completion a house which has received a large amount of publicity as the first house built in Mississippi under the revived F.H.A.; perhaps the first F.H.A. house so built in the country.

Designed by Henry G. Markel, prominent Jackson architect, as his own home, this house is an excellent example of what intelligent architectural design can incorporate within a relatively small cubic area without any sacrifice of livableness; at a cost under \$6,000.

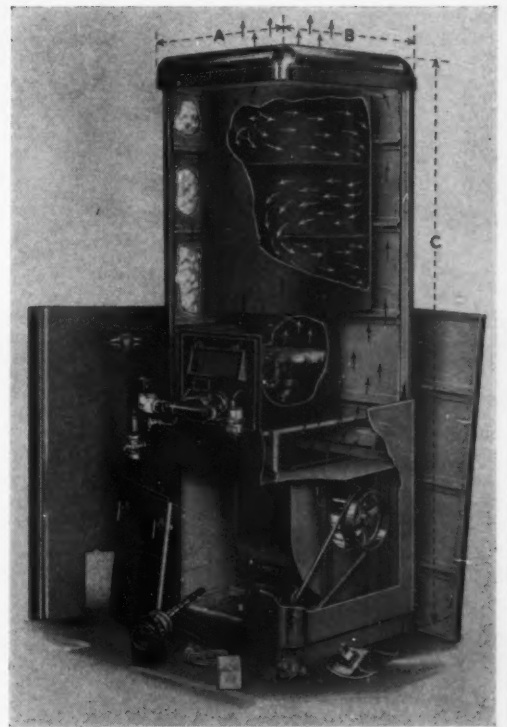
Exterior construction is brick veneer, building paper, wood sheathing, studding, lath and plaster. The heat loss is 78,000 Btu per hour at ten degrees above zero. There is no basement; the first floor is $\frac{7}{8}$ -inch sub-flooring, building paper, $\frac{7}{8}$ -inch finished flooring (hard wood) on 2 by 12-inch joists.

The owner's original intention was to use two floor furnaces (gas fired), but because of the room arrangement and occupancy it was decided that floor furnaces were impractical and one upright, closet-type, gas furnace with an output at the bonnet of 96,000 Btu was selected.

The installed price of the heating system shown in the plans was approximately \$500.

The furnace, as shown, is located in a room just large enough for the equipment; off center, and toward one end of the long axis. This location sacrifices practically no floor space—an offset from the hall; another from one bath, cleverly ending the tub; and some small footage from one bed room closet—supplies sufficient space.

The warm air supply system is all in the attic. The furnace bonnet rises straight up as a plenum into the attic and two main runs, each with four

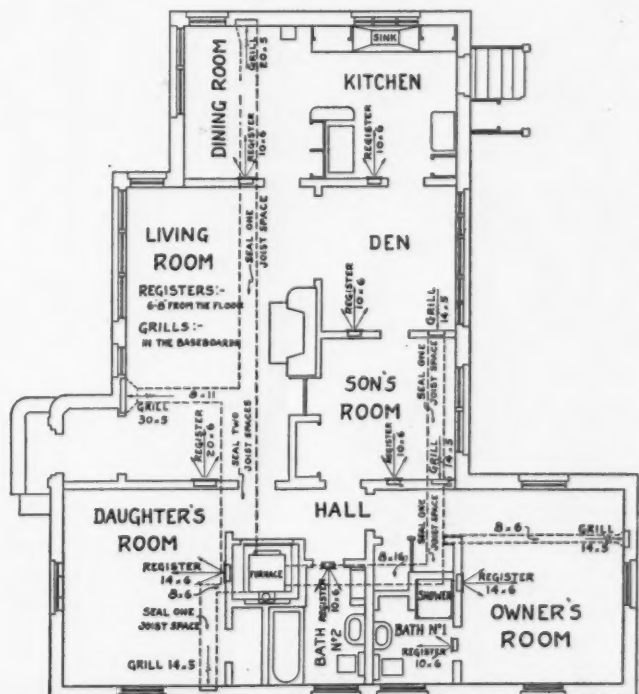
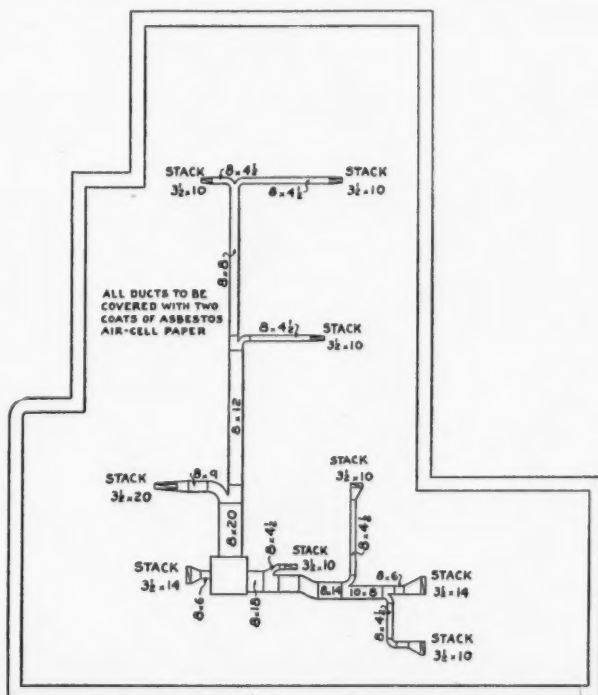


branches, serve all rooms. For insulation, all warm air pipes are covered with two layers of air cell asbestos. The rectangular mains and branches connect with stacks which drop down partitions to directional flow registers 6 feet 8 inches above the floor. Registers are so located and adjusted that warm air blankets all outside walls and glass areas.

Register air temperature used is 125 degrees at 1,300 cfm. Warm air mains and branches are sized by a combination Standard, Technical and Mechanical code adopted by the Security Stove and Manufacturing Co., of Kansas City, engineers of the system and manufacturers of the equipment.

All returns are beneath the floor and consist of boxed single or double joist spaces and full ducts across joists. All return lines come together in a boxed pan directly under the furnace which is a special type for installations of this kind.

Installation was made by McKay Plumbing Co., of Jackson.



Gravity System for a Low Cost House



THE William J. Mitchell organization of Cleveland will build the house shown here for \$5,300 including a lot or \$4,900 without the lot. In addition to the features shown, the completed structure has shutters on the front windows, a wrought iron railing along the steps and landscaping.

The house has a full basement, as this organization has found basementless houses less popular than houses with basements. The second floor is accessible, but not finished at the above price.

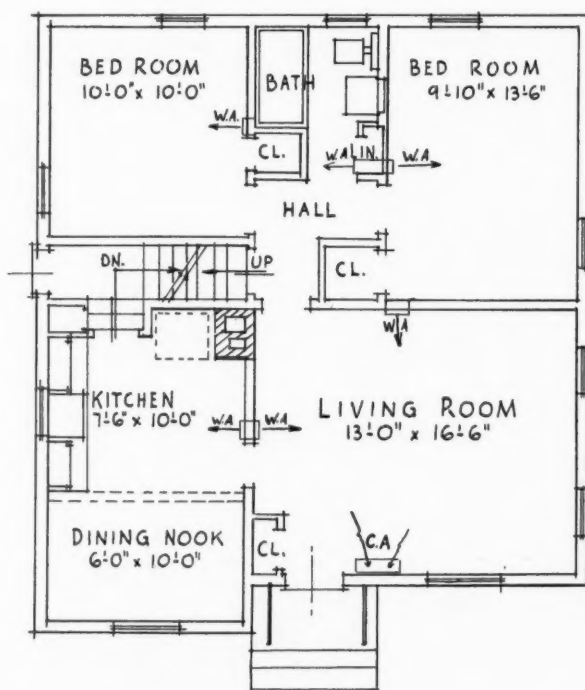
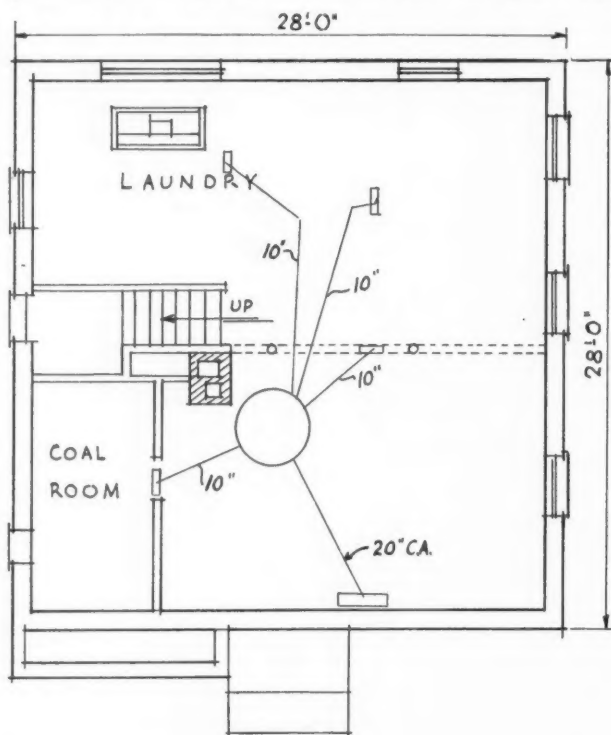
The exterior wall consists of red cedar siding, building felt, Insulite sheathing, 2 by 4-inch studs, Gypsum lath and two coats of plaster. The heat loss coefficient is .21 Btu per hour, per foot, per degree temperature difference. The Insulite sheathing is carried across the ceiling of the first floor for further insulating effect. The first floor is single hardwood flooring with a basement ceiling of Gypsum lath.

The heating system consists of a Niagara coal-fired, gravity furnace. For less than \$100 additional a gas furnace is installed. The installed price of the heating plant shown is \$198 for coal or \$253 for gas. The

heat loss of the house is 49,400 Btu per hour. The capacity of the coal furnace is 56,000 Btu per hour. The plan shows location of warm air registers and the single return. All warm air pipes are sized according to the Gravity Code and in this house are all 10-inch round pipes. As shown, there is a double register for the living room and kitchen; a double register for the bath and bedroom; another single register for the living room; a single register for the second bedroom. The 14 by 30-inch floor grille connects to a 20-inch round pipe for the return. All registers are located in the baseboard.

On the gravity coal furnace, no automatic control is used; on the gas installations a room thermostat operates the gas valve.

This builder has completed a number of houses of this type. So far no fan or blower has been used as the difference in cost between a gravity coal and a winter air conditioning, coal, system is sufficient to cover the cost of the basement. The builder also reports that the inclusion of a basement offsets the disadvantage of not offering a winter air conditioning system. The installation shown was made by the L. P. Kenney Co., Cleveland.



Precalculated Engineering

The editors hope that readers will think well enough of this Precalculated Engineering idea to recalculate the tables to fit peculiar local construction. If, for example, window areas are not $2\frac{1}{2}$ by 5 feet, the tables of window equivalent wall areas can be refigured as explained in this article. Also, if your customary temperature difference is more or less than 70 degrees, you can correct the heat loss by using Table 10 published in this article.

By G. A. Voorhees
Consulting Engineer,
Indianapolis, Ind.

IN the May issue a table (Table 9) was presented to be used where windows are not $2\frac{1}{2}$ by 5 feet in size. Using this table, windows of almost any size may be converted to equivalent numbers of standard size. The May article also showed mathematically where some time may be saved by not calculating window loss too accurately. And for those who wish to know just how Table 9 was calculated, the derivation of Table 9 factors was explained.

In some sections of the country the "standard" window $2\frac{1}{2}$ by 5 feet used in Tables 1 to 7 will not be a "standard" window, therefore, the contractor who uses these tables day after day will save time by calculating his own tables for window losses based upon a window "standard" to his locality. Once having calculated these revised tables of window loss, it will not be necessary to use Table 9 excepting where odd sized windows are encountered.

The following explanation is given to aid contractors in calculating their own tables of window loss.

Such calculations may be made directly from the basic data and formulas given in Part I (January) or they may be derived more easily and with very little error by applying the correction factors in Table 9.

To apply the Table 9 correction factors in building up new window loss sections of Tables 1 to 7 inclusive, proceed as follows:

First, decide what window dimensions represent the best average value for your community and adopt them as "standard." Assume for illustration, that the size selected is 3 feet wide by $5\frac{1}{2}$ feet high.

Second, find in Table 9, the factor corresponding to the newly chosen dimensions. For a 3-ft. by $5\frac{1}{2}$ -ft. window this factor is found to be 1.3.

Third, multiply each tabular value in the window loss section of each table by this factor to get the new set of values. Thus, for an assumed new standard size of 3-ft. by $5\frac{1}{2}$ -ft. for which the factor is 1.3, the values shown in the window section of Table 2, May issue, Page 56, are changed as follows:

TABLE 9

Number of double hung windows 2-ft. 6-ins. wide by 5-ft. high producing total transmission and infiltration heat loss equivalent to that of one window of dimensions shown.

Height of Opening Feet	Width of opening, feet								
	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"
2'-0"	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0
2'-6"	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1
3'-0"	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
3'-6"	0.4	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.4
4'-0"	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5
4'-6"	0.5	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.6
5'-0"	0.6	0.7	0.9	1.0	1.2	1.3	1.5	1.6	1.8
5'-6"	0.6	0.8	1.0	1.1	1.3	1.4	1.6	1.7	1.9
6'-0"	0.7	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0
6'-6"	0.7	0.9	1.1	1.3	1.5	1.6	1.8	2.0	2.2
7'-0"	0.8	1.0	1.2	1.4	1.5	1.7	1.9	2.1	2.3
7'-6"	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4
8'-0"	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.4	2.6

For plain windows—no weatherstrip, no storm sash:

Number of windows	Value shown in original table		Corrected value for new table
1	1.9	x 1.3	= 2.5
2	3.8	x 1.3	= 4.9
3	5.6	x 1.3	= 7.3

The same process would be followed for the remaining numbers of plain windows listed; also for all sizes of the other three types of windows covered by the table.

The following *partial* tabulation (which will need to be extended to cover from 6 to 10 windows) shows the changes which are made in the window losses of Table 2. All other tables 1 to 7 inclusive, will have to be separately corrected in the same manner.

Type	Number of equivalent windows				
	1	2	3	4	5
Plain—no weatherstrip, no storm sash....	2.5	4.9	7.3	9.8	12.2
Weatherstrip only—no storm sash	2.1	4.2	6.1	8.2	10.3
Storm sash only—no weatherstrip	2.0	4.0	6.0	7.9	9.9
Both weatherstrip and storm sash	1.6	3.3	4.8	6.4	7.9

If a new standard size is set up for windows, a new set of Table 9 factors will also need to be calculated from the formula given above for Table 9 factors, *except* that the denominator will no longer be 1600 (see May article, page 98). The new value of this denominator will be determined from the expression:

$$(66 \times w \times h) + (141 \times w) + (94 \times h)$$

by substituting for *w* and *h*, the width and height in feet, of the newly adopted standard. If the new

standard is made 3-ft. by 5½-ft., then this denominator becomes approximately 2000.

Temperature Difference Other Than 70°

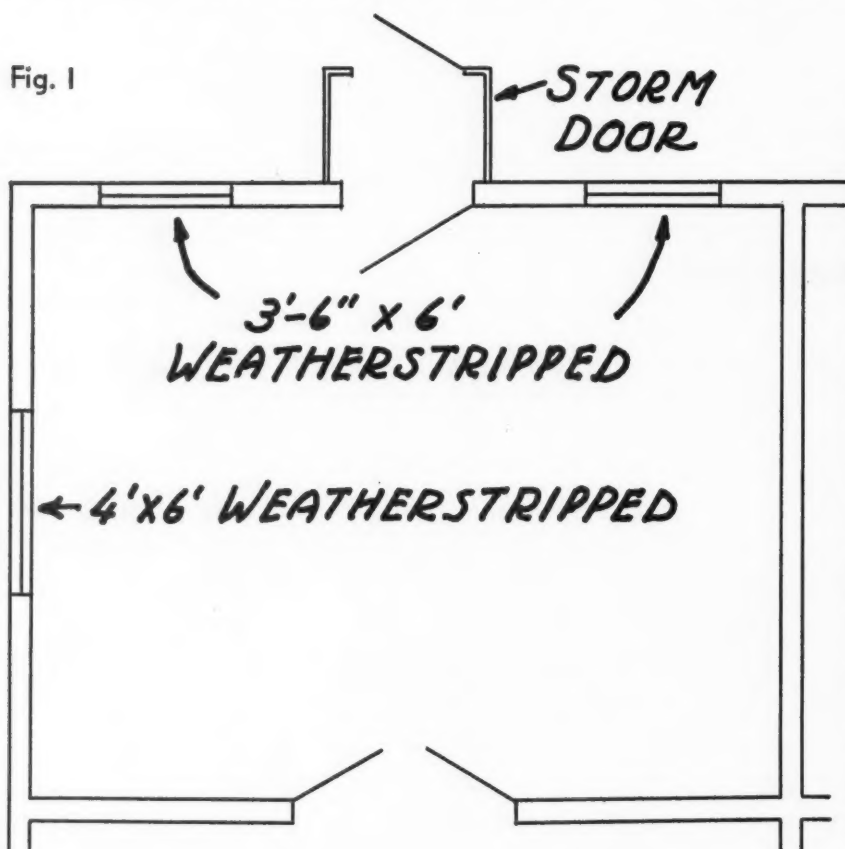
Regarding the use of a 70-degree inside-outside temperature difference as standard for these tables, it is true, of course, that there are many localities where heating plants must be designed on the basis of some outside temperature other than zero. But it is likewise true that zero is accepted as a satisfactory basis in a greater number of localities than any other one outdoor temperature. Hence, in basing these tables on a 70-degree difference, we are merely conforming to a recognized and established custom.

Heat losses for a 70-degree temperature difference as given in the precalculated tables, can be easily converted by means of Table 10, to equivalent losses for other temperature differences ranging from 40 degrees to 110 degrees.

Suppose for example that the room shown in Fig. 1 is in a locality where the design of a heating plant is based on an outside temperature of 20 degrees below zero. For a 70-degree room temperature, the difference between inside and outside temperature is then 90 degrees. The data sheet in Fig. 1 shows a heat loss of 18.1 (18,100 Btu. per hour). In the column at the left of Table 10 giving the heat loss for a 70-degree difference, locate the value nearest to 18.1 which is found to be 18.0; then in the same horizontal line with 18.0 and in the column headed 90-deg. it is seen that the corresponding heat loss for an outside temperature 20 degrees below zero is 23.1 or 23,100 Btu. per hour.

As a further example, assume that a bathroom is

Fig. 1



Room	Dimensions 13x17		
Construction of exposed wall	#11		
Table No. 2	Ceiling height 9½	Heat loss	
Running feet exposed wall	30	4.0	
WINDOWS			Equiv. No. of standard windows
Type	Dimensions	No.	
W	3½x6	2	3
W	4x6	1	1.7
			4.7
			5
			7.9
Outside doors	Type S	1	2
			3.1
Cold ceiling	Floor above	Dimensions 13x17	
			3.1
Cold floor	none		
Heat loss for 70-degree temperature difference			18.1
Corresponding heat loss for Temp. Diff. of			degrees

to be maintained at 80 degrees in a locality where the outside design temperature is 30 degrees below zero; then the temperature difference is $30+80=110$ degrees. If the precalculated heat loss tables give a heat requirement of 5.0 (5,000 Btu. per hour) for the bath room, this will be the loss for a 70-

degree difference since the tables are constructed on that basis. To find the corresponding loss for the 80-degree room temperature and minus 30-degree outside temperature, locate the 70-degree loss (5.0) in the left hand column and running across to the 110-degree column it is seen that the equiva-

Table 10
Heat Losses in Thousands of Btu Per Hour for Inside-Outside Temperature Differences of:

70 deg.	40 deg.	50 deg.	60 deg.	80 deg.	90 deg.	100 deg.	110 deg.	70 deg.	40 deg.	50 deg.	60 deg.	80 deg.	90 deg.	100 deg.	110 deg.
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	19.5	11.2	13.9	16.7	22.3	25.1	27.9	30.7
0.2	0.1	0.1	0.2	0.2	0.3	0.3	0.3	20.0	11.4	14.3	17.2	22.9	25.7	28.6	31.4
0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.5	20.5	11.7	14.7	17.6	23.4	26.4	29.3	32.2
0.4	0.2	0.3	0.3	0.5	0.5	0.6	0.6	21.0	12.0	15.0	18.0	24.0	27.0	30.0	33.0
0.5	0.3	0.4	0.4	0.6	0.6	0.7	0.8	21.5	12.3	15.4	18.4	24.6	27.6	30.7	33.8
0.6	0.3	0.4	0.5	0.7	0.7	0.9	0.9	22.0	12.6	15.7	18.9	25.1	28.3	31.4	34.6
0.7	0.4	0.5	0.6	0.8	0.9	1.0	1.1	22.5	12.9	16.1	19.3	25.7	28.9	32.1	35.4
0.8	0.5	0.6	0.7	0.9	1.0	1.1	1.3	23.0	13.2	16.5	19.7	26.3	29.6	32.9	36.2
0.9	0.5	0.6	0.8	1.0	1.2	1.3	1.4	23.5	13.5	16.8	20.2	26.9	30.2	33.6	37.0
1.0	0.6	0.7	0.9	1.1	1.3	1.4	1.6	24.0	13.7	17.2	20.6	27.4	30.9	34.3	37.7
1.5	0.9	1.1	1.3	1.7	1.9	2.1	2.4	24.5	14.0	17.5	21.0	28.0	31.5	35.0	38.5
2.0	1.1	1.4	1.7	2.3	2.6	2.9	3.1	25.0	14.3	17.6	21.5	28.6	32.2	35.7	39.3
2.5	1.4	1.8	2.1	2.9	3.2	3.6	3.9	25.5	14.6	18.2	21.9	29.1	32.8	36.4	40.1
3.0	1.7	2.1	2.6	3.4	3.9	4.3	4.7	26.0	14.9	18.6	22.3	29.7	33.4	37.1	40.9
3.5	2.0	2.5	3.0	4.0	4.5	5.0	5.5	26.5	15.2	18.9	22.7	30.3	34.1	37.9	41.6
4.0	2.3	2.9	3.4	4.6	5.1	5.7	6.3	27.0	15.5	19.3	23.3	30.9	34.7	38.6	42.4
4.5	2.6	3.2	3.9	5.1	5.8	6.4	7.1	27.5	15.7	19.7	23.6	31.4	35.4	39.3	43.2
5.0	2.9	3.6	4.3	5.7	6.4	7.2	7.9	28.0	16.0	20.0	24.0	32.0	36.0	40.0	44.0
5.5	3.1	3.9	4.7	6.3	7.1	7.9	8.6	28.5	16.3	20.4	24.5	32.6	36.6	40.7	44.7
6.0	3.4	4.3	5.1	6.9	7.7	8.6	9.4	29.0	16.6	20.7	24.9	33.1	37.3	41.4	45.5
6.5	3.7	4.6	5.6	7.4	8.4	9.3	10.2	29.5	16.9	21.1	25.3	33.7	37.9	42.1	46.3
7.0	4.0	5.0	6.0	8.0	9.0	10.0	11.0	30	17.2	21.5	25.7	34.3	38.6	42.9	47.1
7.5	4.3	5.4	6.4	8.6	9.6	10.7	11.8	31	17.7	22.2	26.6	35.4	39.7	44.3	48.6
8.0	4.6	5.7	6.9	9.2	10.3	11.4	12.6	32	18.3	22.9	27.4	36.6	41.1	45.7	50.3
8.5	4.9	6.1	7.3	9.7	10.9	12.2	13.4	33	18.9	23.6	28.3	37.7	42.4	47.1	51.9
9.0	5.1	6.4	7.7	10.3	11.6	12.9	14.1	34	19.4	24.3	29.1	38.9	43.6	48.5	53.5
9.5	5.4	6.8	8.1	10.9	12.2	13.6	14.9	35	20.0	25.0	30.0	40.0	45.0	50.0	55.0
10.0	5.7	7.2	8.6	11.4	12.9	14.3	15.7	36	20.6	25.7	30.9	41.1	46.3	51.4	56.5
10.5	6.0	7.5	9.0	12.0	13.5	15.0	16.5	37	21.2	26.4	31.7	42.3	47.6	52.8	58.1
11.0	6.3	7.9	9.4	12.6	14.2	15.7	17.3	38	21.7	27.1	32.9	43.4	48.8	54.3	59.7
11.5	6.6	8.2	9.9	13.1	14.8	16.4	18.1	39	22.3	27.8	33.4	44.6	50.1	55.7	61.3
12.0	6.9	8.6	10.3	13.7	15.4	17.2	18.9	40	22.9	28.6	34.3	45.7	51.4	57.1	62.8
12.5	7.1	8.9	10.7	14.3	16.1	17.9	19.6	41	23.4	29.3	35.1	46.9	52.7	58.5	64.4
13.0	7.4	9.3	11.1	14.9	16.7	18.6	20.4	42	24.0	30.0	36.0	48.0	54.0	60.0	66.0
13.5	7.7	9.7	11.6	15.4	17.4	19.3	21.2	43	24.6	30.7	36.9	49.1	55.3	61.4	67.5
14.0	8.0	10.0	12.0	16.0	18.0	20.0	22.0	44	25.1	31.4	37.7	50.3	56.5	62.8	69.1
14.5	8.4	10.4	12.4	16.6	18.6	20.7	22.8	45	25.7	32.1	38.6	51.4	57.9	64.3	70.6
15.0	8.6	10.7	12.9	17.1	19.3	21.4	23.6	46	26.3	32.9	39.4	52.6	59.2	65.7	72.3
15.5	8.9	11.1	13.3	17.7	19.9	22.2	24.4	47	26.9	33.6	40.3	53.7	60.4	67.1	73.8
16.0	9.1	11.4	13.7	18.3	20.6	22.9	25.1	48	27.4	34.3	41.1	54.9	61.7	68.5	75.4
16.5	9.4	11.8	14.1	18.9	21.2	23.6	25.9	49	28.0	35.0	42.0	56.0	63.0	70.0	77.0
17.0	9.7	12.1	14.6	19.4	21.9	24.3	26.7	50	28.6	35.7	42.9	57.1	64.3	71.4	78.6
17.5	10.0	12.5	15.0	20.0	22.5	25.0	27.5	60	34.3	42.9	51.4	68.6	77.1	85.7	94.3
18.0	10.3	12.9	15.4	20.6	23.1	25.7	28.3	70	40.0	50.0	60.0	80.0	90.0	100.0	110.0
18.5	10.6	13.2	15.9	21.1	23.8	26.4	29.1	80	45.7	57.1	68.6	91.4	102.9	114.3	125.7
19.0	10.9	13.6	16.3	21.7	24.4	27.2	29.9	90	51.4	64.3	77.1	102.9	115.7	128.6	141.4
								100	57.1	71.4	85.7	114.3	128.6	142.9	157.1

lent loss under the actual conditions will be 7.9 (7,900 Btu. per hour).

If the total heat loss of a house as determined either from the precalculated tables or by any other method based on a 70-degree difference, is found to be 143,000 Btu. per hour and the corresponding loss is wanted for a community where it is customary to design on an outdoor basis of 10 degrees above zero, Table 10 may be used as follows:

Since the table does not list 143 in the 70-degree column, the value 143 is broken down into $100 + 40 + 3$ and the equivalent found for each of these elements. For an assumed average room temperature of 70 degrees and an outside temperature 10 degrees above zero, the inside-outside temperature difference is 60 degrees and the equivalent values will therefore be found in the 60-degree column; thus:

In the left hand (70-degree difference) column of Table 10, locate 100 and following across in the same horizontal line and in the 60-degree column, the corresponding value is found to be 85.7 which means that a heat loss of 100,000 Btu. per hour with a 70-degree difference, reduces to 85,700 Btu. per hour when the temperature difference is 60 degrees.

In the same way, locate 40 in the 70-degree column and find the corresponding value in the 60-degree column to be 34.3, which means that a heat loss of 40,000 Btu. per hour at a 70-degree difference, becomes 34,300 Btu. per hour at a 60-degree difference. Finally, locate 3 in the left column and note that the corresponding value in the 60-degree column is 2.6, showing that a loss of 3,000 Btu. per hour reduces to 2,600 Btu. per hour when the inside-outside temperature difference changes from 70 degrees to 60 degrees.

When using the table in this way, errors can be guarded against by tabulating the data, thus:

Heat loss in 70-degree column	Heat loss in 60-degree column
100	85.7
40	34.3
3	2.6
<hr/>	
Total 143	122.6

The result shows that the heat loss of this house for a 60-degree temperature difference is 122,600 Btu. per hour.

How Table 10 Is Calculated

Table 10 is calculated on the usual assumption that the heat loss of a room or building is directly proportional to the difference between the inside and outside temperatures. In other words, the heat loss for an inside-outside temperature difference of 1 degree is 1/70th of the loss for a 70-degree difference.

Thus, in the example just given, where the elements 100 thousand Btu., 40 thousand Btu. and 3

thousand Btu. were converted from the 70-degree to a 60-degree basis, it works out like this:

$$\begin{aligned} 1/70\text{th of } 100 &= 1.4286 \text{ and } 60 \times 1.4286 = 85.716 = 85.7 \text{ approx.} \\ 1/70\text{th of } 40 &= 0.5713 \text{ and } 60 \times 0.5713 = 34.278 = 34.3 \text{ approx.} \\ 1/70\text{th of } 3 &= 0.0429 \text{ and } 60 \times 0.0429 = 2.574 = 2.6 \text{ approx.} \end{aligned}$$

The values in the table are calculated to one decimal place because there would be no practical advantage in carrying precision further than this. To illustrate, consider again the house having a heat loss of 143,000 Btu. per hour at a 70-degree inside-outside temperature difference and for which the table gives a corresponding loss of 122,600 when the temperature difference is 60 degrees instead of 70 degrees. The approximate value of 122,600 varies from the precise value by only a little more than 2/100ths of 1 per cent as the following computation shows:

$$\begin{aligned} 1/70\text{th of } 143 &= 2.042857 \text{ and } 60 \times 2.042857 = 122,571 \\ 122,600 - 122,571 &= 29 \\ \frac{29}{122,571} \times 100\% &= 0.0236 \text{ per cent} \end{aligned}$$

Anyone who cares to extend Table 10 to include inside-outside temperature differences of less than 40 degrees or more than 110 degrees, can very easily do so by dividing each of the values shown in the 70-degree column by 70 and multiplying the quotient thus obtained by the inside-outside temperature difference for which the new column is being calculated. The same rule applies to any intermediate column which might be wanted in the table as, for instance, one for a temperature difference of 65 degrees which would be useful in a community where it happened to be customary to design for a room air temperature of 70 degrees with an outdoor temperature of 5 degrees above zero. The following tabulation shows the procedure for several 70-degree values and all others would be treated in a like manner in computing a 65-degree column.

Value shown in 70-deg. column of Table 10		Heat loss for temp. difference of 1 degree		Corresponding heat loss for 65-degrees	Approximate value to list in new 65-deg. column
0.1	÷ 70 =	0.00143	× 65 =	0.09295	0.1
0.4	÷ 70 =	0.00571	× 65 =	0.37115	0.4
8.0	÷ 70 =	0.11429	× 65 =	7.42885	7.4
16.5	÷ 70 =	0.23571	× 65 =	15.32115	15.3
48.0	÷ 70 =	0.68571	× 65 =	44.57115	44.6

In showing the tabular values to only one decimal place, the greatest percentage of error comes in the lower brackets where it is of least consequence. Thus, in showing 0.1 instead of 0.09295 as the 65-degree column equivalent of 0.1 in the 70-degree column, the error amounts to:

$$\frac{0.1 - 0.09295}{0.09295} \times 100\% = 7.6 \text{ per cent}$$

Expressed in per cent this error seems large, but when it is recalled that 0.1 means 0.1 *thousands* of

Btu., an error of 7.6 per cent is only $0.076 \times 0.1 \times 1000 = 7.6$ Btu. per hour—and in practical calculations of heat requirements of rooms, anything less than 100 Btu. per hour is negligible. In the table 0.1 represents $0.1 \times 1000 = 100$ Btu., so any precision beyond 0.1 in tabular values need not be considered.

Table 10 was calculated by following the method described. Each value in the 70-degree column was divided by 70 to obtain the loss for a 1-degree difference and the 1-degree value multiplied by each of the several temperature differences for which columns were computed.

To further illustrate the several methods which may be followed in converting a heat loss based on a 70-degree difference, into an equivalent loss for some inside-outside difference other than 70 degrees, let's take a rather unusual example and apply each correction method. Assume that we are called upon to lay out a mechanical heating system for a warehouse to maintain an inside temperature of 32 degrees with an outside temperature 15 degrees below zero and that, from the precalculated tables, it has been found that the heat loss for a 70-degree inside-outside difference is 236.7 or 236,700 Btu. per hour.

Three general methods will be considered:

1. By interpolating in Table 10.
2. By direct calculation.
3. By the 1.5 per cent per degree method.

1. By the tabular method a double correction is involved because: (a) Table 10 does not show the value 236.7 in the 70-degree column; and (b) because it does not have a column for a 47-degree temperature difference. (An inside temperature of 32 degrees with 15 degrees below zero gives the 47-degree inside-outside temperature difference).

The value 236.7 is broken down into the elements $100 + 100 + 36 + 0.7$ and since the table has no 47-degree column, values are taken from the next lower and next higher columns which are those for 40 degrees and 50 degrees:

Heat loss in 70-degree column	Heat loss in 40-degree column	Heat loss in 50-degree column
100	57.1	71.4
100	57.1	71.4
36	20.6	25.7
0.7	0.4	0.5
Totals 236.7	135.2	169.0

Having thus found the heat losses for inside-outside differences of 40 degrees and 50 degrees, we find the value for the intermediate difference of 47 degrees by interpolation. The value for 47 degrees will be equal to the value for 40 degrees plus 7/10ths of the difference between the 40-degree and 50-degree values.

The 40-degree value was found to be..... 135.2
Seven-tenths of the difference between the 40-deg. and

$$50\text{-deg. values is } 0.7 \times (169.0 - 135.2) \\ = 0.7 \times 33.8 \dots\dots\dots 23.7$$

By addition, the value for 47 degrees is..... 158.9

2. By direct calculation, the value for a 47-degree difference will be 47 times the value for one degree, and the 1-degree value will be the 70-degree value divided by 70, thus:

$$236.7 \\ 47 \times \frac{\quad}{70} = 47 \times 3.381 = 158.9$$

3. By the "1.5 per cent per degree method" with which many furnace men are familiar because it has been in the Standard Gravity Code for a number of years, the procedure is this: Forty-seven degrees is 23 degrees less than 70 degrees. One and one-half per cent per degree for 23 degrees is $1.5 \times 23 = 34.5$ per cent which, expressed decimally is 0.345 and the 70-degree value (236.7) multiplied by 0.345 gives $0.345 \times 236.7 = 81.7$ to be deducted from 236.7 which gives $236.7 - 81.7 = 155.0$.

Methods 1 and 2 give more accurate results than method 3 because the per cent per degree method is an approximation based on the fact that the heat loss for *each* degree of inside-outside temperature difference is 1/70th of the loss for a 70-degree difference. If the loss for 70 degrees is taken as 100 per cent, then the loss for each degree will be 1/70th of 100 per cent which is 1.43 per cent. Because 1.5 per cent is easier to remember and apply than 1.43 per cent, the Gravity Code specified 1.5 per cent. The error which results in the use of this method is not serious. In the present example it amounts to:

$$\frac{158.9 - 155.0}{158.9} \times 100\% = 2.45 \text{ per cent}$$

An error of approximately two and one-half per cent in estimating the heat loss of a house is not serious because the heat transmission coefficients on which heat loss estimates are based, are not accurate to within such a small limit. Therefore, anyone who finds it more convenient to use the 1.5 per cent per degree method in adjusting heat loss estimates, shouldn't hesitate to do so merely because it makes a difference of two or three per cent in the final results.

It is hoped in this connection, that the tables being presented in this series, together with the accompanying explanations which show *both* their practical value and their limitations, will point the way to more rapid and more effective working methods for the average job—that they will help the plant designer to combine reasonable accuracy and speed. Both are needed.

In the next two articles to follow the author covers the calculations for infiltration; the effect of fireplace ventilation; makeup air for satisfactory combustion; and leads into the problem of selecting the proper furnace size, how to check chimneys for draft and how to rate an existing gravity furnace for capacity under forced air circulation.

An Inventory of Attic Ventilation in Southwest Cities —New Orleans—

THE most intensive and longest sustained campaign on attic ventilation has been carried on in New Orleans. The program started in 1932 when New Orleans Public Service Co., Inc., became interested in the idea and tried to enlist the support of several sales agencies. Since the entire idea was new in 1932 and not much publicity had been given the plan, less than a dozen sales agencies cooperated and only 9 installations were sold. The agencies were all direct representatives of fan manufacturers or manufacturers of fans located in New Orleans.

In 1933 a few additional sales agencies joined the plan, but public acceptance was not established and only 19 installations were made, mostly by the same agencies as in 1932.

The service company determined in 1934 to really publicize the idea of attic ventilation. A survey was made which disclosed that one obstacle seemed to be the wide divergence in prices and lack of any uniform system. Owners might get several proposals all different in type, kind of equipment, price and guarantee. To overcome this, the service company with the aid of cooperating dealers determined to publicize a complete system, ready to run, guaranteed to do certain things, and sold for a set price. Also the service company offered a free survey and a free proposal. After the summer's effort 54 installations were recorded.

Fans in Battery

In 1935 a local fan manufacturer entered the field with a two bladed propeller of about 1,500 cfm and began to advocate use of smaller fans in battery. Others followed suit and between this stimulus and increased publicity greater public acceptance was secured. More dealers tried selling ventilating sys-

RAISE THE Roof AND YOU'LL GET THE AIR!

If it were possible to roll up your roof and allow it to remain suspended several feet above the rooms for an hour or so each evening, your house would cool off quickly. For it is that stagnant layer of air, radiating heat to your rooms from the sun-baked roof, that causes such distress when real hot weather comes.

But there's another way to blow out that heat—discharge it from the space just beneath your roof—COMFORT COOLING BY AN ATTIC VENTILATING FAN—effective because it's Nature's way to achieve ventilation—tried and proved by hundreds of Orleansians.

Often this quiet fan is installed in the attic (and installation is an easy job), in some graceful corner of fresh outside air sucking every room to cool as a lake-side resort.... Come see the best designs right now!

Here's the idea in drawings and get just the kind of unit for your house! We'll have an expert surveyor visit your home, make a survey of your house, select one or more fans, and give you a getting-out-the-heat plan. Call or write...

PHONE TODAY FOR FREE ESTIMATE

NEW ORLEANS PUBLIC SERVICE INC.

tems and while the new comers accounted for only a minor part of the sales, the combined effort of more men talking cooling began to stir up increased interest. The records at the end of 1935 showed 72 installations sold.

1936-1937 Sales Programs

In 1936 it became evident that if attic ventilation was really to get started more man power was needed. Prospects had to be told about the idea by several sales agencies. Firms which could concentrate on the sale of fans and nothing else during the summer were sought out. In 1936, some additional outside manufacturers became active and set up their own representatives. Also four local dealers developed their own fans and concentrated on the New Orleans market. One of the largest fan manufacturers enlarged his sales force, brought in a sound slide picture which was portable and mailed large quantities of literature.

The public service company also brought out some new literature of a more elaborate nature and mailed booklets to an enlarged list of customers. Before the summer was over the public service company withdrew its direct sales effort since it believed there was then enough dealers active to carry the

**DO YOU LIVE IN
Only Part of Your House
IN SUMMER?**



**COMFORT COOLING WITH AN ATTIC FAN
IS NEW ORLEANS'
MOST POPULAR SOLUTION**

Attic Ventilation will enable you to enjoy cool comfort throughout your home this summer. Hundreds of other Orleansians have found this moderately priced investment the remedy for feverish daytime nights and days when the porch was the only spot that wasn't blisteringly hot.

It's effective because it's a natural, logical way to combat heat: a quiet fan is placed in the attic out of the way, and draws through obscure grille, from the heat-ridden rooms below, the stifling, muggy air which causes discomfort, forcing in at the same time a supply of fresh air from outdoors.

Installation is easy... initial cost astonishingly low. It operates from a switch conveniently located and costs so little to run that most seem hardly notice it... even when they say about attic ventilation—then plan NOW, ahead of the heat, to let COMFORT COOLING help you enjoy your entire home this summer.

WE WILL HELP YOU PLAN YOUR INSTALLATION

Now's the time to investigate and get just the kind of fan your home should have so that your family will have a full summer's enjoyment. We'll gladly make a survey of your home, with our own experienced, and make you a genuine cost estimate. Call 845-4444—Do it today.

TO ANYONE WANTING A COOL HOME during the warm summer months... a highly recommended "attic fan" is the answer. It is a small, quiet, efficient fan which is installed in the attic, drawing out the hot air and replacing it with fresh air from outdoors. The fan is connected to a switch in the room, and the entire system is so simple to install that anyone can do it.

"THE COST IS MINOR" is a common expression. "My fan cost \$15.00," says Mr. J. L. Smith, 1212 Canal Street, "but it has saved me a great deal of money by keeping the house cool. I don't have to open the windows, and I don't have to use the air conditioner. It's a real money saver."

"ENTIRELY SATISFACTORY" is a common expression. "My fan cost \$15.00," says Mr. J. L. Smith, 1212 Canal Street, "but it has saved me a great deal of money by keeping the house cool. I don't have to open the windows, and I don't have to use the air conditioner. It's a real money saver."

NEW ORLEANS PUBLIC SERVICE INC.

Typical newspaper advertisement explaining operation and principles of attic ventilation.

program along. The results at the end of the season were 178 systems checked and over 200 systems sold for the year.

When the field survey was made, the final records for 1937 had not been compiled. Increased sales effort by sales organizations; more man power provided by the manufacturers and dealers plus more advertising and publicity based upon the increasing number of satisfactory systems recorded 227 installations by August and final figures will probably show more than 250 installations made. About one-third of the 1937 systems employed two fans or more.

During 1937 some of the individual dealers carried on their own advertising campaigns in a very modest manner. The public service company advertised in two morning and two evening papers during May, June and July. All leads were passed in rotation among the cooperating dealers. However, two dealers were given each lead so that if for any reason one dealer did not respond the other was likely to do so.

When the advertisements were carried over the name of the public service company replies averaged fairly low. On the other hand, when the advertisements appeared over the signature of the cooperating contractors replies poured in.

The "Standard" Proposal

To overcome some of the difficulties of trying to have all bidders talk about the same general type of system, a standard proposal was worked out by a committee of three dealers and one New Orleans Public Service representative. This was accomplished (Continued on page 80)

PROPOSAL FOR ATTIC VENTILATION		PROPOSAL	
TO: Mr. _____		We propose to install a complete Attic Ventilation System in the Job Address given above, including Fan, or Fans, labor, and materials for construction of Suction Box, if necessary, exhaust outlets, grilles, and electric wiring as follows:	
Business Address: _____		Fan: Manufactured By: _____ Type: _____ Size: _____	
Residence Address: _____		C.F.M. _____ R.P.M. _____	
Job Address: _____		Motor: Manufactured By: _____ Type: _____ totally enclosed.	
		H. P. _____ Volts _____ R.P.M. _____	
		Grilles: Type _____ Location: _____ Finish: _____	
		Exhaust: Open Eaves <input type="checkbox"/> Levers: Automatic <input type="checkbox"/> Cypress <input type="checkbox"/>	
		Porch Grille <input type="checkbox"/> Storm Proofed <input type="checkbox"/> Metal <input type="checkbox"/>	
		Special Roof Vent <input type="checkbox"/> Painted <input type="checkbox"/>	
		Suction Box: Made of _____ with folding doors, and equipped with fusible link and fire prevention switch, all in accordance with the regulations of the Louisiana Fire Prevention Bureau.	
		Electric Wiring: Certificate of inspection will be furnished covering the electrical wiring of the fan installation.	
		Special Equipment: Automatic time switch, type _____	
		Delivery: Fan and material are to be delivered on premises about _____ Date of delivery is contingent upon strikes, accidents, delays of carriers, or other causes, unavoidable or beyond the reasonable control of the contractor. Seller's responsibility for loss or damage to fan or material ceases with delivery on the premises, except for loss or damage caused by negligence or carelessness of Seller or his authorized agents.	
		Price: \$ _____	
		Above price is subject to acceptance within thirty (30) days.	
		Terms: _____	
		Guarantee: Fan, Motor, and all construction work are guaranteed against material defects for one year from date of installation.	
		Yours very truly,	
		DEALER	
		ACCEPTED THIS _____ day of _____, 1937	
		OWNER	

DATA	
Type of Building: Single <input type="checkbox"/> Double <input type="checkbox"/> Two-Story <input type="checkbox"/> Duplex <input type="checkbox"/>	Roof: Single <input type="checkbox"/> Tile <input type="checkbox"/> Slate <input type="checkbox"/>
Brick <input type="checkbox"/> Stucco <input type="checkbox"/> Frame <input type="checkbox"/>	Attic: Finished <input type="checkbox"/> Unfinished <input type="checkbox"/>
Minimum Volume of Air Required per Minute: Single Story—Total Cu. Ft. (one floor) multiplied by one. Two-Story—Total Cu. Ft. (one floor) multiplied by one and one-half.	
Hall: Length _____ Width _____ Head Room Above Grille: _____ feet.	
Dimensions of Building: Ceiling Height _____ Length _____ Width _____ Total Cu. Ft. _____	
For this Proposal: _____ Cu. Ft. (one floor) × _____ = _____ Cu. Ft.	

The system consists of an exhaust fan or fans, located at the end of a Suction Box, which is built over a Grille. The fan end is provided with folding doors which automatically open, or close, as the fan is started or stopped. The top of the Suction Box is hinged at the end opposite to the fan, so that it may be lowered in winter to close the Grille, and is automatically closed in case of fire by the operation of a fusible link, in accordance with the regulations of the Louisiana Fire Prevention Bureau. The air, which is drawn up through the Grille, is expelled from the attic in various ways, usually by means of louvers, or opening the eaves, or by a porch grille. All, as specified herein.



Your comment or experience is invited.

PROBLEM CORNER

Basement Condensation

American Artisan:

Recently we encountered a condensation condition in a local residence and our results in remedying the condition are not satisfactory.

To familiarize you with the condition, we quote as follows:

"The foundation wall is of poured concrete approximately 14" thick. The size of the cellar is approximately 26 x 34 x 7' high. There are sufficient windows in the cellar although the grade line is approximately 6' from the cellar floor. There is an entrance from outside leading into the cellar with a regulation door. The cellar is dry at all times throughout the year except during July and August when the walls sweat from the floor to a height of 3'. The cellar floor appears to be dry during this time. The walls and floor have been painted."

We installed a duct approximately 16" x 16" from the floor to a window opening together with a 16" fan discharging 1500 cfm. When we found the condition still prevailed, we reversed the fan to drive the air from the outside to the cellar floor. Still there are no results evident. Temperature tests show 75 degrees against 60 per cent humidity.

What we would appreciate knowing is whether or not fans will eliminate this condition. Do you believe if we installed another fan on the opposite side the condition would be remedied?

**Reply by
The Editors**

Our only suggestion to the conditions you specify in your letter of July 20th is that the fourteen inch concrete wall is so thick that it is difficult, if not impossible, to bring the temperature of the concrete up to room air temperature during the time when condensation appears on the wall.

If your room air temperature is 75 degrees and the relative humidity is 60%, you have a condition showing a wet bulb temperature of 66 degrees and a dew point of about 60 degrees, so, if the concrete is lower in temperature than 60 degrees, you are bound to get condensation of moisture. The chances are that the ground temperatures at the floor line are probably 52 degrees or there about.

So far as we can judge your plan of introducing large volumes of outdoor air is the only practical solution and it may well be that one fan to pump air in and another fan to pump air out will be the only method you can use to secure results. Of course, you could insulate the inside surfaces of the walls to obtain a dry surface.

Attic Temperature Table

American Artisan:

In the New Technical Code there is a table, Table 1, which shows the temperatures existing in attics at different outside temperatures and for various coefficients of transmission. Please explain what these coef. means in the first column mean?

S. J. Illinois.

**Reply by
The Editors**

In explanation of the U_e or U_p factors in Table I, if you will read the paragraph immediately below the table, you will see that it says "when the rates of heat transmission U_e or U_p are as in Table I . . . "This means that these factors from .1 to .6 refer to the number of Btu. per hour per square feet of area per degree of temperature difference for the particular ceiling or partition. This is only a method of setting up a table of co-efficients.

To use this factor for U_e or U_p as for instance the first factor (.6) turn to Table III under Ceilings, page 9 and item No. 16 for lath and plaster ceiling, no floor above, has a co-efficient of .62. In Table I, the authors have dropped the last .02 and used only .6. Item No. 16B, substituting 1/2-in. rigid insulation for the lath is given in Table III as .35 and in using Table I, you could choose between .4 or .3, depending upon just how generous you wanted to be with your ceiling loss.

Stack Sizes for High Registers

American Artisan:

In designing a forced warm air system having first floor registers in the baseboards and second floor registers 6 ft. 6 in. above the floor is it proper to size all ducts to the various rooms and the registers the same as though all second floor registers were in the baseboard. The register velocity was 350 fpm.

O. F. D., Missouri.

**Reply by
The Editors**

In answer to your question regarding velocities where registers are located above the breathing line, we would say that the register velocities to be used should depend somewhat upon the length of "air throw" from the register; in other words, the distance from the register to the facing wall.

Where registers are located above the breathing line, best results are obtained if the register velocity is sufficient to carry the air stream completely across the room and down the facing wall. Ordinarily this requires a register face velocity of not less than 500 fpm and may go above 600 fpm if the throw is long.

So far as the stacks are concerned, most contractors try to control the register face velocity with the free area of the face and the register box and not by reducing or enlarging the size of the stack. There are so few standard stack sizes that control over the stack is exceedingly limited. You can maintain control over velocities in the branch pipes in the basement but we believe you will have more success through control at the box and face than by any other means.

In a forced air system all registers, and all floors are treated alike for branch and stack sizes since the fan maintains a pressure.

We enclose tear sheets of two articles which go into this subject in some detail and if the explanation is not entirely clear to you, we will be glad to answer any questions.

WHAT *You* GET AS A WEIR-MEYER DEALER



And, by that, we mean COMPLETE! Complete as to FUEL. (Specific designs for coal, oil and gas—not merely "adaptations"). Complete as to SIZES. Complete as to STYLE (worthy of today's most modern home). Complete as to PRICE range. Complete as to CONSTRUCTION. In fact, the WEIR-MEYER line "has everything."

A Truly
Complete
LINE

Dealer
Protection

Sales Helps
and
Engineering Service

Reputation
And Background
Plus VISION

WHO MAKES IT
MAKES A DIFFERENCE'

When a dealer lines up with us, he starts a relationship that WE hope will last for years. He is our partner—and, at the same time, he is utterly independent. The "co-operation" exists as long as it is mutually desired—and that it constitutes a desirable connection is attested to by hundreds of WEIR-MEYER dealerships that have lasted upwards of 25 years.

We learned long ago that we can sell a dealer only as many of our products as HE re-sells—so we lend every dealer all the experience and assistance we have accumulated in over fifty years. And our Dealer Helps really HELP. Local newspaper ads, direct-mail, attractive sales-literature, Engineering Service and a liberal Financing Plan.

Everywhere the WEIR-MEYER names are known, they stand supreme—like Packard or Cadillac. We've been fifty years building—and guarding—these good names. And part of the building has been constant leadership—helped by our Dealer Associates through the years. Engineering developments born of VISION backed by EXPERIENCE keep us "out in front" wherever warm air heating and air-conditioning are concerned.

If you think you'd like to be associated with us, we want to hear from you.

THE MEYER FURNACE COMPANY
PEORIA, ILLINOIS



Established 1866
Manufacturers of
WEIR AND MEYER STEEL FURNACES AND DOMESTIC AIR CONDITIONING APPLIANCES

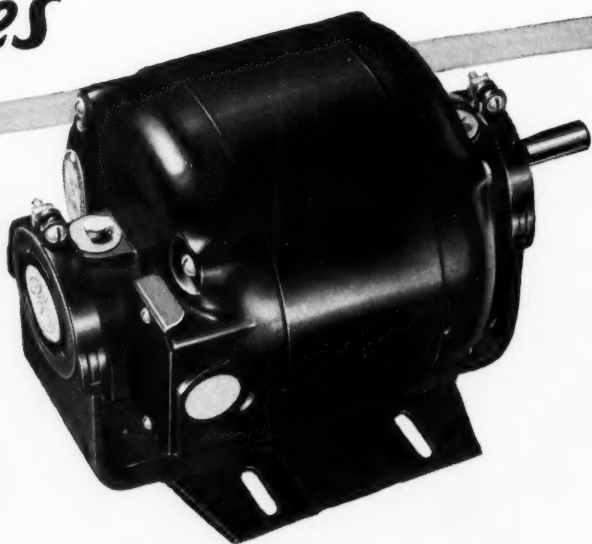
SIGN OR CLIP TO
LETTERHEAD

THE MEYER FURNACE COMPANY, PEORIA, ILLINOIS
Please Send Full Dealer Details

NAME _____
ADDRESS _____

A Sales Booster in Both Places

AT THE STORE



IN THE HOME

A Convincing Argument

THE motor illustrated is a G-E rubber-mounted, split-phase motor for fan and blower applications. Let's take it apart and find out why it gives service that makes satisfied users.

The rotor, with its one-piece cast-aluminum winding, is practically indestructible—it cannot become open-circuited or burn out. How long will it last? That's like asking the life of a fan blade, for this rotor does not require servicing.

General Electric's method of stator construction has been proved in actual field service on hundreds of applications—the real test of its correctness.

The starting-switch mechanism is good for more than a million starts—equivalent to a service life of at least fifty years on fan applications.

The bearings are packed with wool that filters the oil and keeps a constant supply of fresh, clean oil on the bearing surfaces. They have



Service That Makes Friends

extra-large oil-storage capacity and require oiling but once a year.

G-E motors are quiet. They are carefully balanced and are available with rubber mounting. Their operation does not interfere with radio reception. You can be sure that G-E motors on your applications will do their part to please your customers. General Electric, Schenectady, New York.

GENERAL ELECTRIC

Filing No. 8260

070-253

27th Annual

National Association of Sheet Metal Distributors



Left to right—Robert H. Lyon, Vice President, A. W. Howe, President, and A. J. Becker, Vice President, National Association of Sheet Metal Distributors.

National Association of Sheet Metal Distributors 27th Annual Meeting was opened by President A. W. Howe, of the J. M. & L. A. Osborn Company, Cleveland, who outlined some of the progress made by the Association in the preceding year.

John H. VanDeVenter, editor of *Iron Age*, delivered an address entitled "Sheet Steel's Future Is Still in Front." Mr. VanDeVenter outlined at some length the growth of the sheet steel industry, and pointed out the new markets which were constantly developing for the product.

The Hon. Harold G. Mosier, Congressman at Large, of Cleveland, discussed "Legislation Affecting Business." Congressman Mosier outlined some of the purposes of the Wages and Hours bill, as well as some of the proposed amendments to the Wagner Act, and outlined his position on the Wages and Hours bill. Mr. Mosier also pointed out the problems of relief and unemployment, which he felt business must face.

O. F. Murphy of Lyon, Conklin & Company, Inc., Baltimore, Chairman of the Tin and Terne Plate Committee, asked for remarks from attending distributors as to the conditions in the various territories.

Bruce Wilson of the Federal Housing Administration, Washington, D. C., went into "Possibilities under the National Housing Act." He explained the functions of FHA and pointed out the success with which the Act has been administered, both from a modernization standpoint and new residences. He cited that the losses incurred under operation of the Act were exceedingly small, and that eventually the losses would be converted into actual profit because properties recovered under the foreclosure provisions of the Act were actually very saleable because of a rising real estate market.

Mr. Wilson described the efforts of FHA to modernize the thinking of everyone connected with the building industry, and as an example pointed out that in our modern subdivisions there was really no excuse for the sale of lots on the old idea of 30, 40 and 50 foot frontage, with a corresponding great depth. Mr. Wilson also pointed out that the merchandising of low cost houses was still in its formative stages and that everyone connected with the industry would have to put their shoulder to the wheel in an effort to bring costs down for the average American home buyer.

At the conclusion of Mr. Wilson's address President Howe urged distributors to take real advantage of all of the provisions of FHA, and cited the success with which his company had taken advantage of the remodeling phase, with an increasing profit.

Dr. H. H. Maynard, Professor of Marketing, and Chairman of the Department of Business Organization, Ohio State University, addressed the convention on "Recent Price Legislation—Its Effect Upon Distribution." Dr. Maynard went into great detail explaining the decisions of the Federal Trade Commission acting upon citations which were allegedly in violation of the Robinson-Patman Act. Dr. Maynard emphasized that all distributors should make a real effort to determine actual sales costs based on an evaluation of the cost per call on different classes of customers. He also urged them to use real cost accounting to determine their costs of distribution on various lines handled. He emphasized that these facts would not only be of great assistance to the distributor in his price set-up, but would be of great assistance to the distributor in justification for

his claims for functional discounts under the Robinson-Patman Act.

A. J. Becker, Ohio Valley Hardware & Roofing Company, Evansville, Ind., Chairman of the Committee on Galvanized and Black Sheets and Corrugated Roofing, led a discussion on what could, and should, be done by the mills to improve conditions in the distribution of galvanized and black sheets and corrugated roofing. Following this discussion President Howe appointed Messrs. F. O. Schoedinger, Columbus, Ohio, O. F. Murphy, Lyon, Conklin & Company, Baltimore, and A. J. Becker, Ohio Valley Hardware and Roofing, Evansville, Ind., as a Mill Committee to meet with representatives of the mills in an endeavor to effect the changes outlined in Mr. Becker's report.

Secretary-Treasurer George A. Fernley in his report called attention to the many services rendered by his office to the membership in the course of the year, and emphasized that his office was always willing to cooperate with every member, individually, in helping establish better credit practices on the part of members' customers. It was brought out, in a discussion of this report, that the wholesalers reporting, reported a net profit of much less than 4 per cent in the year 1937.

Joseph J. Lockwood, Vice President, The American Brass Company, discussed at quite some length the sheet copper situation, and in the course of his remarks quoted many interesting sidelights on the growth and development of the sale of sheet copper from earliest times, to date.

E. H. Hoffeld then read his report as Chairman of the Eaves Trough and Conductor Pipe Committee, which was accepted by the convention without comment.

In the unavoidable absence of Joseph Stelwagon, Stelwagon Mfg. Company, Philadelphia, Chairman of the Prepared Roofing Committee, Secretary-Treasurer George A. Fernley gave his report, in which he called attention to the fact that a large number of prepared roofing manufacturers were adding to their jobbers' lists straight dealers, and called attention to the fact that such manufacturers were guilty of a misclassification of jobbers and distributors. He asked the convention to appoint a committee to meet with the prepared roofing manufacturers' association in an endeavor to secure cooperative effort toward better trade practices. In the discussion which followed the report, W. B. Alexander, Sales Manager of the Barrett Company, called attention to the fact that the situation in prepared roofing, as far as his company was concerned, had never affected them and emphasized that his company was committed to a very definite policy of the sale of their product for roofing from manufacturer to jobber, to dealer or applicator.

In the election which followed the following were unanimously re-elected:

President—A. W. Howe, The J. M. & L. A. Osborn Company, Cleveland.

Vice President—Robert H. Lyon, Lyon-Conklin & Co., Inc., Baltimore.

Vice President—A. J. Becker, Ohio Valley Hdw. & Roofing Co., Evansville.

Secretary-Treasurer—George H. Fernley, Philadelphia.

Assistant Secy.-Treas.—Percy F. Hord, Philadelphia.

Executive Committee 1938-41—H. E. Usinger, Berger Bros. Co., Philadelphia; Bruce Hanes, The Southern Iron Co., St. Louis.



ASSOCIATION ACTIVITIES

National Convention

Monday, June 13th, will be devoted to meetings of the Association's Standing Committees and Board of Directors.

The Convention proper will open Tuesday morning, June 14th, at 9:30 A. M. in the Sky Room, Plankinton Hotel, Milwaukee, Wisconsin, with a special message by the organization's President, L. R. Taylor, followed by an address by Professor G. L. Larson, Chairman of Department of Mechanical Engineering of the University of Wisconsin, the keynote address.

"Some things Successful Local Associations are Doing."—J. D. Wilder, Chicago.

"Humidity and Wall Condensation."—Professor L. G. Miller, Head Department of Mechanical Engineering, Michigan State College, East Lansing, Michigan.

"Practical Publicity Plan."—H. T. Richardson, New York City.

Tuesday afternoon, our Research Session, Vice-President F. G. Sedgwick, Chairman. This session will be opened by "Installation Codes Committee Report," Professor J. D. Hoffman, Lafayette, Indiana.

"Report and Observations."—F. G. Sedgwick, Chairman, Research Advisory Comm.

Professor A. P. Kratz and Professor S. Konzo will present:

"Pressure Losses in Elbows and Changes in Section."

"Stoker Firing—Progress Report."

Report on the progress of the new book, "Forced Warm Air Heating."

Tuesday evening there will be a Buffet Supper and special entertainment in the Sky Room of the Plankinton Hotel for all in attendance at our Convention, provided by The L. J. Mueller Furnace Company, H. P. Mueller, Chairman.

Wednesday morning there will be—Sound Movie, "Romance of Iron and Steel," courtesy of the American Rolling Mill Company, Middletown, Ohio.

"Cooling Controls for the Residence"—George D. Kingsland, Minneapolis, Minn.

"Let's Maintain the Position the Industry Now Enjoys."—E. A. Jones, Milwaukee, Wis.

Question and Answer Hour—To be conducted by B. F. McLouth and Fred Bishop.

(The trade is invited to write or bring questions they would like answered).

Wednesday afternoon will be our Annual Golf Tournament at the beautiful New Ozaukee Country Club, one of the finest courses in Milwaukee.

Allen W. Williams, Managing Director.

Toledo

At the 28th annual meeting of the Toledo Sheet Metal and Roofing Contractors Association held recently, the following trustees were elected: Joseph Dersher, Frank A. Warnke, Lee B. Faunce, Carl W. Schmidlin, and Clarence Christen.

The trustees at a meeting following the annual meeting elected Lee B. Faunce, president, Frank A. Warnke, vice-president, Clarence Christen, treasurer, and Henry C. Bitter, executive secretary.

The president has appointed the following standing committees for the ensuing year:

Labor Relations Committee—Joseph Dersher, chairman, Clarence Christen, Carl Schmidlin, Frank A. Warnke, Lee B. Faunce, and the Secretary.

Warm Air Heating Code Committee—Carl Schmidlin, chairman, Roland Smith, James Steeman, C. A. Vogeli, Lee B. Faunce, and the Secretary.

Roofers Committee—Wesley Beuche, chairman, Frank A. Warnke, Joseph Dersher, Clarence Christen, Herman Nordmann, C. A. Vogeli, Lee B. Faunce, and the Secretary.

On May 7 a letter was sent to all members with a resume of the year's activities and calling attention to the next regular meeting.

Henry C. Bitter, Secretary.

National Secretaries' Conference

The National Secretaries' Conference, representing air-conditioning, ventilating and heating, sheet metal and roofing work, and allied industries, met on May 14th at the Cleveland Hotel, Cleveland—Frank E. Ederle, chairman.

The following subjects were carefully considered and discussed:

The Chicago Conference, reminiscences.—Paul L. Biersach, Sec'y, Wis. Sh. Met. Con. Assn.

National Sheets, Their Origin, Past, Present and Future.—F. E. Ederle, Sec'y., Michigan Sh. Met. Con. Assn.

Apprentices, Necessity to Our Industry and, The Toledo System.—H. C. Bitter, Sec'y., Toledo, Sh. Met. Con. Assn.

Celotex, Iniquity to Our Industry, Cleveland's Problem, other Areas Included.—D. A. Mannen, Sh. Met. Employers Assn., Inc., Cleveland.

Paint, No. 6-506 First Grade Tinner's Red Paint, for Roofing, etc.—Private Brand.—H. R. Allison, the Gibson-Homans Co., Cleveland.

Miscellaneous subjects considered were: The Construction Industry's Position with present W.P.A. set up. Copper Sheets, etc., etc.

The next meeting will be held at Buffalo on Saturday, July 16.

Paul L. Biersach, Secretary.

Wisconsin

The State Board of Directors of the Master Sheet Metal, Heating, Ventilating & Air Conditioning Contractors Association, Inc., of Wisconsin met at the Danish Brotherhood Hall, Kenosha, on May 6th. John B. Wallig, prominent sheet metal contractor of Kenosha, with the members of their local, made arrangements for the meeting. Thirty-two sheet metal contractors from all over the state were present at this district meeting.

Secretary Biersach gave a voluminous report on the Secretaries' Conference, also on the new organization—Wisconsin Construction Industries Advisory Council. The entire membership requested Secretary Biersach to attend the next Secretaries' Conference at Cleveland and a contribution was voted for the running of the expense of the new Wisconsin Construction Industries Advisory Council.

New members were admitted to the organization. Lunch and refreshments followed the meeting.

The Board held a meeting on Saturday, June 4, at La Crosse, Wisconsin.

Paul L. Biersach, Secy.

Los Angeles

David E. Fulwider, attorney, of 6331 Hollywood Boulevard, Hollywood, California, is representing The Heating, Piping and Air Conditioning Contractor's Association of Southern California, recently incorporated in Los Angeles County. Directors are J. M. Moriarty, B. K. Stoneman of Los Angeles, and Frank J. White of Pasadena, California.

2,000 Low-Cost Model Homes Will Use Copper in Vital Points

**National Demonstration to
show inexpensive dwellings
can be well-built**

An estimated 2,000 low-cost demonstration homes are scheduled to be built this year throughout the country for the National Small Homes Demonstration. The main purpose of this building program—sponsored by the National Lumber Manufacturers' Association and the National Retail Lumber Dealers' Association—is to show that low-cost houses can be *well-built*. That's why it's interesting to know that in these houses COPPER has been approved and recommended for valleys and flashings.

Quality with Economy

These houses will help to advertise a truth that every home-builder should know, namely, that *Copper is not expensive*. In fact, copper is an actual economy when lifetime service is considered. This is your opportunity to get profitable contracts. Let home-builders know that you are headquarters for Anaconda Copper.



Copper Flashings
Copper Valleys



Anaconda Copper & Brass

THE AMERICAN BRASS COMPANY • General Offices: Waterbury, Connecticut
Offices and Agencies in Principal Cities • Subsidiary of Anaconda Copper Mining Company

Association Activities

New York State

The New York State Association of Sheet Metal Roofing and Air Conditioning Contractors usually has two or three meetings of the officers and directors during the course of the year.

In the meeting held at Syracuse those present were President Stevens, Secretary Meyers, Treasurer Klick and the following Directors: Thomas of Utica, Otten and Noragon of Buffalo, Heaphy of Syracuse, Keays of Albany, Pontius of Geneva and Daniel of Newburgh. Also present was E. J. Kader of Buffalo, Chairman of the Committee on Compensation Insurance, and George Ballard of Rochester, one of the ex-presidents of the Association.

Minutes of previous meetings were read and approved and reports received in reference to accounts of the Convention and the auditing of the books.

It was decided to have a representative attend a meeting in regard to closer cooperation with other building employers' organizations and the State Builders Association.

It was decided also to make efforts to secure further concessions on the quantity differentials on copper.

A letter was received from the URCA in regard to working together for the benefits of the trade and the meeting was favorable towards cooperation.

A pamphlet was received from the Toledo Sheet Metal Contractors Association describing their apprenticeship system and the information contained therein may be secured by any members of the State Association who may be interested.

A request was received from the Wisconsin State Association to cooperate with them in protesting to Congress against WPA competing with contractors. A resolution was passed that it was the opinion of the State Association that no Government funds should be used in contracting and that all work should be let to legitimate, established contractors or sub-contractors.

The Secretary reported in regard to a Conference held in Chicago by the Secretaries of the different State Associations and he was authorized to attend, along with President Stevens, the next meeting to be held in Cleveland.

Director Heaphy reported in regard to a Conference held in Syracuse with contractors and others who are interested in a State Association of Building Trades.

The meeting gave careful attention to the matter of Group Insurance. Mr. Reamer of the State Insurance Department explained the group plan and then answered numerous questions in reference to different phases.

E. J. Kader of Buffalo, Chairman of the Committee on Insurance, reported that they have more than \$45,000 in premiums already pledged. This, if adopted by the State Association, will permit of a special group being set up when \$50,000 or more in premiums is pledged on the part of members of the Association. The Association will then provide a Committee to make the rules for the handling of the risks and this Committee will have authority to pass on the eligibility of those who wish to be insured in this group.

The group will be open only to members of the State Association and they will be given an immediate discount of 15 per cent from the regular rate which they may be paying. Thus, if a member is insured in a Stock Company or a Mutual Company and is paying the regular manual rates, he will be accepted in this group on payment of 15 per cent less than the regular manual rates. If he already has established an experience rating which gives him a discount from the regular manual rates his new premiums will be based on this lower rate. That is, if he has an experienced rating which gives him a rating of 15 per cent below the manual rates, the group insurance premium will be 15 per cent under that rate, so that he will pay only \$72.25 of premium for each \$100.00 regular manual rate. All of the risks in this special group will be rated exactly the same as they are now so that they will have the benefit of any experience rating which they may have received,

but they will be given a 15 per cent discount so that where they would pay \$100 premium to a stock or mutual company they will be required to pay only \$85.00 to this special group.

As this will be really a group of selected risks there should be a substantial saving in the cost. Whatever saving is made, less a small amount which the State Association Committee may desire to place into a Reserve Fund, will be distributed to the insurers in this State group.

It was the belief of the Insurance Committee that the members could expect a further saving which would make a total saving for the first year of 35 per cent on the total premiums at the regular rates with additional savings in the next two years which would bring the total to 40 per cent on the second year and 45 per cent during the third year.

This was based on the assumption that with the better risks only being carried in this group and with the care and attention which the local organizations as well as the members throughout the State would give towards securing safer methods of doing business, and better scaffolding and other equipment, this saving is entirely possible. In the case of one group a saving of 70 per cent was made so that the Committee feels that they are not being too optimistic in estimating a saving of 35 per cent the first year, 40 per cent the second and 45 per cent the third year, and thereafter. The members who go into the group fund risk nothing because if the losses should be heavier than anticipated these losses would be made up from the General Reserve Fund of the State Insurance Department. Between 40 and 50 groups are now carrying their insurance in this way and are making a substantial saving on their costs of insurance. The plan was endorsed and is recommended to members throughout the State and the Committee was authorized to continue its efforts to secure agreements to place the amount of insurance required to put the plan into effect.

Those interested may secure further details by writing to E. J. Kader, 1178 Bailey Ave., Buffalo, N. Y.

H. A. Daniel.

Illinois

A meeting of the officers and directors of the Illinois Sheet Metal Contractors Association was held in the Jefferson Hotel, Peoria, Illinois, on April 23. The 1939 convention was discussed and a tentative date set for January 18 and 19, 1939 at Peoria.

Those in attendance were President Walter, Vice President Lauerma, Secretary Poe, Treasurer Eynatten and directors Peterson, Radtke and Johns.

President Walter selected J. E. Peterson, C. H. Lauerma and W. W. Johns as a committee to draft a license law to cover the installation of warm air heating and air conditioning equipment, to be submitted at the next regular meeting of the board on the first Saturday in September.

Ralph W. Poe, Secretary.

Chicago

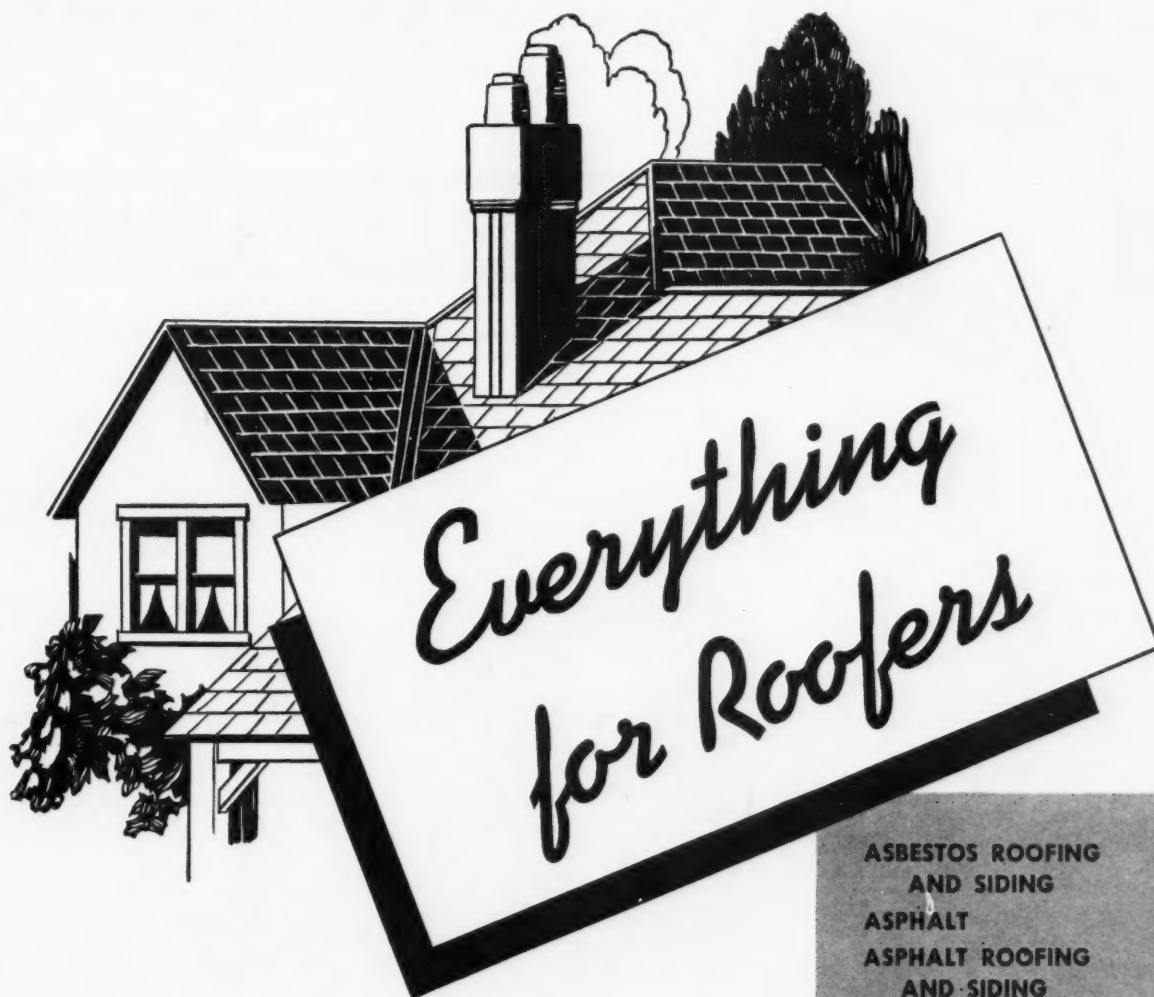
The regular meeting of the Furnace & Sheet Metal Institute was held Thursday night, May 12th, at 2857 Belmont Avenue, Chicago. Various subjects were discussed, among them the FHA financing plan.

Henry Olson, vice-president of the First Banccredit Corp., and an authority on FHA matters, gave a very interesting talk and showed the members present how to take advantage of government assistance to get themselves gutter and furnace repair and blower conversion jobs.

After the meeting refreshments were served.

La Crosse, Wisconsin

The La Crosse Sheet Metal & Air Conditioning Contractors Association has been formed in La Crosse, Wis., with the following officers: President, Palmer Hanson; Vice President, L. F. McNamara; secretary-treasurer, Ed Lassig; chairman of ways and means committee, Bernard Zahn.



Most sheet metal men in the large territory we serve know that they can obtain anything in the line of sheet metal from OSBORN. That is only natural because we've been serving them so long. Not all of them know, however, that this same complete and dependable service is available for all types of roofing.

The wide-spread interest in housing and the low interest rate on money are combining to make this a good roofing year. Whether you confine yourself to repairs, new homes, large commercial work or do all three, you will find that OSBORN carries all of the materials, tools and equipment you use. If you are not already going after some of this business, give it some thought. You will find your OSBORN salesman ready to help you in every way possible.

ASBESTOS ROOFING
AND SIDING
ASPHALT
ASPHALT ROOFING
AND SIDING
CANVAS
CAULKING COMPOUNDS
CEMENT, ROOFING
COPPER ROOFING
FELTS
FLASHING
GALVANIZED ROOFING
INSELBRIC SIDING
INSULATING PAPER
NAILS
PAINT
PAINT OILS
PITCH
ROLL ROOFING
ROOFING CLIPS
ALL TYPES OF TOOLS,
EQUIPMENT AND
SUPPLIES

THE J. M. & L. A.
OSBORN Co
Manufacturers—Distributors
BUFFALO • CLEVELAND • DETROIT

A DEPENDABLE SOURCE
OF SUPPLY FOR 79 YEARS

For your convenience a number has been assigned each item. Check the items in which you are interested on the coupon on page 98 and mail to us. Complete information will be forwarded.

● Indicates product not listed in 1938 Directory.

△ Indicates product and manufacturer not listed in 1938 Directory.

NEW PRODUCTS

△95—Soldering Outfit

Reiner & Campbell, Inc., 242 Lafayette St., New York City, announces a handy portable soldering or welding outfit, for inside or outside work.

Reiner No. 1 and 2 are complete portable soldering, brazing, welding and heating outfits that make their own gas without pumping, or pre-heating, from water, and carbide. The fuel cost is low, approximately 12 cents per day.

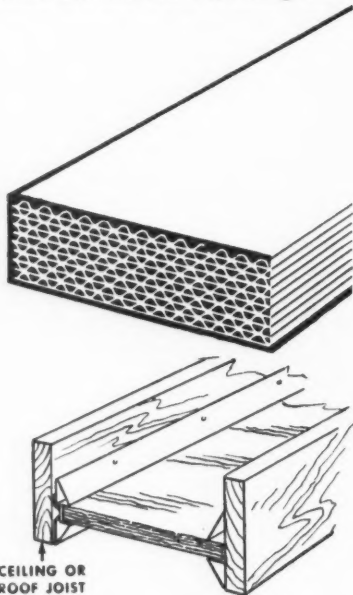
A time payment plan is available.

A 4-page circular describes all four models.

96—Ideal Air-Cell

The Hinde & Dauch Paper Company, Sandusky, Ohio, announces Ideal Air-Cell insulation, which they say contains 95 per cent confined, non-circulating air by volume and only 5 per cent solid materials.

Ideal Air-Cell insulation consists of a multiple of flat and fluted sheets (kraft paper) bonded together with a flexible fire and water resisting cement,

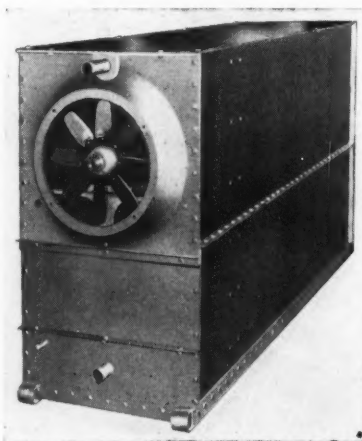


to be inserted between two installing strips, and placed between studs, joists or rafters. The installing strips hold the insulation midway between inner and outer walls.

Ideal Air-Cell insulation retards radiation, stops convection, reduces conduction and handles moisture by capillary attraction to the outside, according to the producers.

●97—Cooling Tower

The Marley Company, 3001 Fairfax Road, Kansas City, Kansas, announces the addition to its line of water cooling equipment a series of small steel-cased induced draft cooling towers. These include horizontal wood filled types for use indoors and vertical types for outdoor service, either wood or spray filled.



The indoor towers are horizontal in construction and in air movement. Four standard sizes range from $2\frac{1}{2} \times 7\frac{1}{2} \times 3$ ft. $2\frac{1}{2}$ in. to $2\frac{1}{2} \times 8\frac{1}{2} \times 6$ ft. $8\frac{1}{2}$ in. Casings and basins are 16-gauge copper bearing steel, shop painted two coats. They are equipped with Marley fans with guard grills which may be removed when a discharge duct is used. Zig-zag drift eliminators of heart redwood and cast iron spacers are built as one unit, easily lifted out for access to tower interior. Removable redwood decks and spacers constitute the filler through which the water filters down after down-spray injection at the top. These towers are shipped fully assembled, with simple instructions, ready for operation.

The Marley Company expects these small series towers—twenty-eight models—to have a broad appeal in the ice-making and air conditioning fields for cooling condenser and compressor circulating water.

△98—Kor-Ner-Lok Machine

Binkley Manufacturing Co., Warren, Mo., announces the Kor-Ner-Lok forming machine, said to make corner or Pittsburgh locks at the rate of 30 feet per minute for rectangular pipes and fittings for heating, ventilating and air conditioning jobs. One man, they say, in one operation, can form five 8-ft. sheets in two minutes.

99—Remote Control Regulator

The Young Regulator Co., 4500 Euclid Avenue, Cleveland, announces new developments for their manual remote control regulators, particularly adaptable for hotels, stores, office buildings, and residences for manual control of air conditioning. Rooms may be conditioned to suit the individual desires of the occupant. The figures on the dial tell how far the damper is open.

The damper is regulated by pulling on a wire and a spring which closes the damper and returns the wire to its original "off" position.

100—New Conversion Blower

Harvey-Whipple, Inc., of Springfield, Mass., manufacturers of Master Kraft oil burners and air conditioning equipment, has announced a new line of conversion blowers designed for converting ordinary warm air furnaces into forced warm air heating systems.

This blower connects directly to an opening in the lower part of the casing of a warm air furnace. Its function is to draw air from the floors of rooms above, through return ducts, filter, then force it into the warm air furnace where it is heated and conducted to



the registers. Its operation is entirely automatic; the blower does not start until after the oil burner has been in operation for a few minutes. During the summer, when the heating plant is not in operation, a manual switch in the living quarters will start the blower, inducing gentle air circulation.

The complete package unit includes blower, motor, filters, cabinet and a variable pitch motor pulley, together with an automatic belt tensioning device. This blower comes in two sizes—a 1000 cfm unit for a normal five room house, and a 1320 cfm unit.

New Products

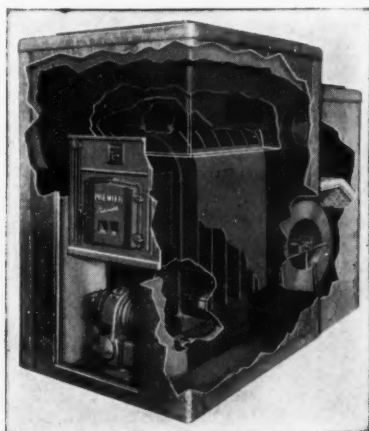
For your convenience in obtaining information regarding these items, use the coupon on page 98.

●101—Automatic Air Conditioner

Premier Furnace Company, Dowagiac, Michigan, is introducing the new Premier Automatik, for the first time available with the Premier pressure burner built in. Regular equipment in-



cludes the Automatik heat generator especially designed for oil firing, blower, filters, complete controls, automatic humidifier, burner, and cabinet. The furnace is of copper bearing



steel electrically welded.

The burner is of the pressure type flanged to the furnace. It is quiet running and economical of fuel. The controls are Minneapolis-Honeywell.

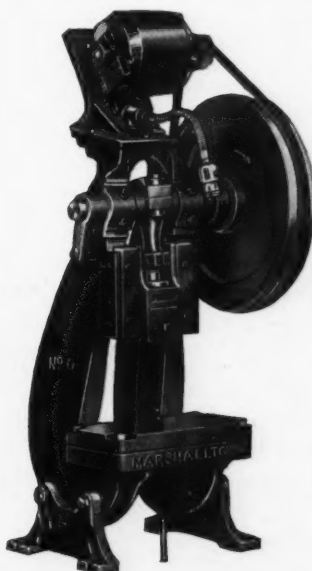
△102—New Line of Electrodes

The McKay Company, Pittsburgh, is offering a complete line of shielded-arc welding electrodes—claimed to be quieter in operation, faster in welding time, produce finer bead appearance, and have greater adaptability per rod.

The makers state that, while the new electrodes are of an improved type, no changes in customary operating practice are required.

103—The Mighty Midget

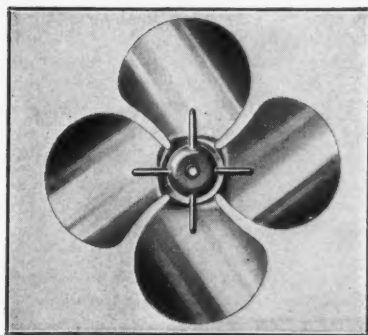
Marshalltown Manufacturing Company, Marshalltown, Iowa, is offering the Mighty Midget bench press. Features of the design are heavier construction, more die space, improved



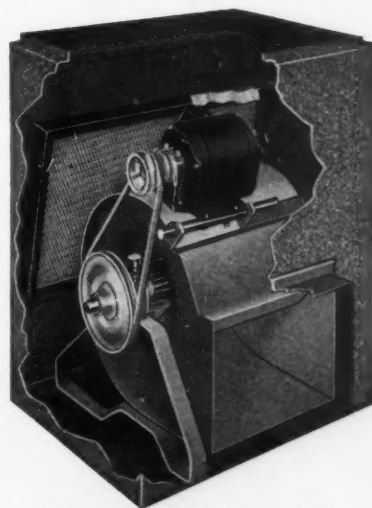
ball and socket connection and easier adjustment. This press is furnished with either individual V belt motor drive or lineshaft operation when required. There is also an improved convertible clutch which will provide either single stroke or continuous operation. This press is available with or without the stand.

●104—Special Propeller Fan

The Torrington Manufacturing Company of Torrington Connecticut, announces that it has added to its line a 12-inch diameter propeller fan which



is made from one piece of aluminum with four wide blades of exceptional rigidity. The blade was designed for use on low powered inexpensive motors and the company claims that it is quieter than the conventional propeller type with narrower blades.



105—Blower-Filter Unit

Air Controls, Inc., Cleveland, Ohio, announces a new Junior Model No. 100 Rex Air-Pak blower-filter unit.

This new unit fulfills the demands for an economical blower-filter unit that comes assembled, ready to install with any warm air furnace.

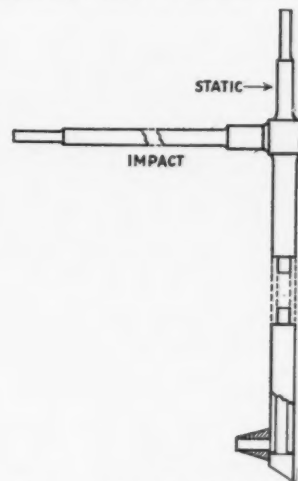
Two 16 by 25 in. filters are standard equipment and are firmly sealed around the edges with felt stripping to guard against dust leakage. The top mounted motor is an important feature as it keeps the motor up off damp basement floors and also keeps it in direct line with the cool air stream, thereby increasing the motor efficiency.

Other important features are the four speed pulley with capacities ranging from 670 to 1300 c.f.m. at $\frac{1}{2}$ S.P. The entire unit is floated on rubber.

106—New Pitot Tube

Ellison Draft Gage Company, 214 W. Kinzie St., Chicago, is offering a new straight-stem pitot tube for use in thick wall ducts where the conventional angle type can not be used.

The outer tube is $\frac{1}{8}$ in. o. d., the



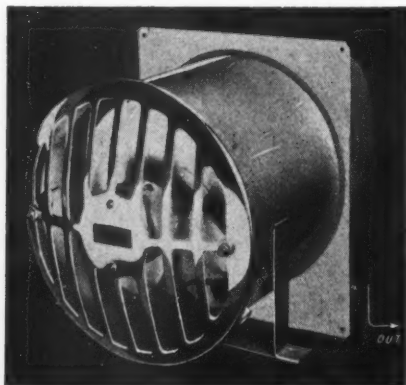
flow end of which is machined at an angle of 59 deg., transmitting a true static pressure through the $\frac{1}{8}$ -in. inner tube when faced at right angles to the flow. By means of a conical tip, facing the flow, a true impact pressure is transmitted through the outer tube.

New Products

For your convenience in obtaining information regarding these items, use the coupon on page 98.

107—"Kitch-n-Ventor"

Universal Blower Company, Birmingham, Mich., has just announced the "Kitch-N-Ventor" with ability to ventilate against an outside, opposing

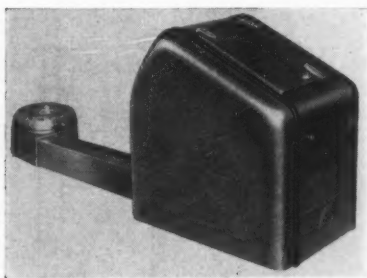


wind of any intensity thru use of a housed, automatic damper instead of the usual louver or door construction. All springs, levers and pull chains are thus eliminated. Operates from wall switch, is sleet and leak proof. The quiet-type 10-in. fan is all aluminum with a capacity of 750 cfm.

• 108—Delco Stokers

Delco-Frigidaire Conditioning Division, General Motors Sales Corporation, Dayton, Ohio, announces three automatic coal stokers as additions to the present General Motors' line.

The addition of coal stokers to the General Motors line gives Delco-Frigidaire equipment serving all classifications of heating, cooling and air



conditioning requirements, with oil furnaces and conversion burners, gas furnaces and winter conditioning units to operate in conjunction with either oil or gas equipment, and central and unit type cooling equipment for domestic and commercial uses. In addition, Delco-Frigidaire has central type systems for year-round conditioning covering both heating and cooling.

The new line of coal stokers are designed to burn bituminous coals.

Two of the three models are designed to serve residences using not

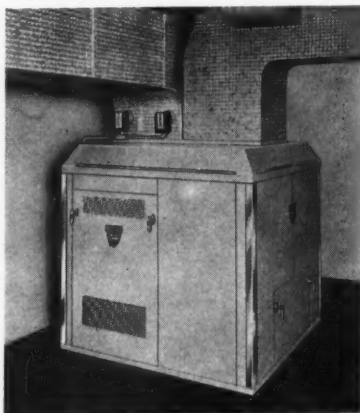
over eighteen tons of coal annually. The third is for residences where the coal consumption is not more than thirty tons annually. The three models blanket the residential market.

Engineered in the General Motors and Delco research laboratories, the new stokers are designed to burn a wide variety of low-cost soft coals. Automatic air controls provide increased combustion efficiency and a heavy-duty transmission insures an agitated fuel bed with a minimum of electric power consumption.

The new stokers are being built by Delco Appliance Division of General Motors at Rochester, N. Y.

109—Warm Air Conditioners

Harvey - Whipple Incorporated, Springfield, Mass., announces three new Master Kraft warm air conditioners for 1938 with heating capacities ranging from a minimum of 80,000 up to 250,000 Btu at registers. All three



employ the Kleenaire principle of adding humidity in the form of purified vapor which has been sterilized by boiling water—with control of humidity by a humidistat and electrical moisture control valve.

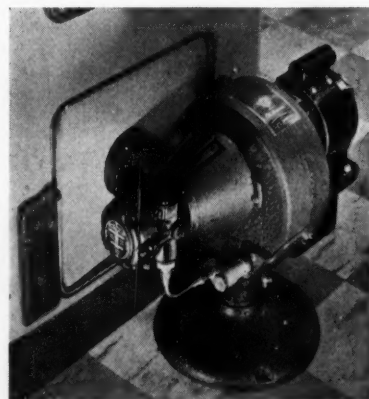
These units feature welded steel construction throughout. Only large, flat heating surfaces, of a self-cleaning nature, are employed in the design, offering scant opportunity for combustion residue to collect. Remarkably high efficiency and low operating cost are assured by the new design employed in the two larger capacity models, whereby flue gasses are obliged to pass through a large, baffled, preheating radiator of welded steel, extending over into the return side of the cabinet. This radiator thus utilizes flue heat to preheat the air stream as it enters the cabinet. Filter area has been greatly increased.

Cabinets are of modern design, smooth lacquer finish in attractive pastel green color, with chrome trim.

• 110—Iron Fireman Oil Burner

Iron Fireman Manufacturing Co., Cleveland, has introduced nationally the Iron Fireman oil burner.

The burner has a two-stage pump, which not only supplies a stream of oil to the nozzle but also circulates another stream of oil from tank to burner—constant circulation of oil prevents airlock. Fuel clogging is said to be reduced to a minimum by seven strain-



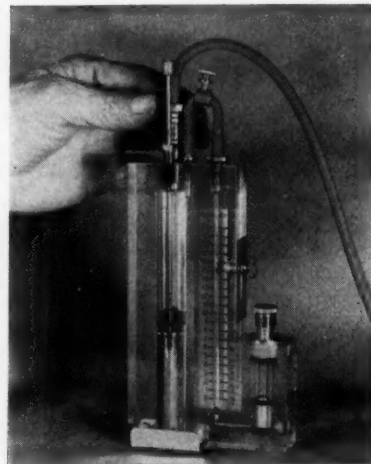
ers. Mechanical strainer in nozzle is of the "washer" type.

One-sixth horsepower capacitor motor has automatic shut-off protection against overheating; resilient mounting, reducing vibration; and can be replaced on the job. Fan rides a motor shaft sleeve. Cover plate can be removed without dismantling machine. Transformer terminals are enclosed within machine for safety. Bus-bars are used to convey current from transformer to contacts. By sliding on slots, the air cone can be adjusted in relation to the nozzle.

△ 111—Pocket CO₂ Analyzer

F. W. Dwyer Manufacturing Company, 565 West Washington Boulevard, Chicago, announces the new Dwyer pocket CO₂ indicator which can be safely carried in a coat pocket. The indicator, complete with carrying case and all accessories, weighs less than three pounds.

This indicator will be valuable to any



boiler room for direct testing of furnace adjustments, and for checking CO₂ recorders for accuracy.

The RIGHT REGULATOR Will Bring You Business!



Sizes: 1/4, 3/8,
1/2, 3/4, 1, 1 1/4,
1 1/2, 2 inches.

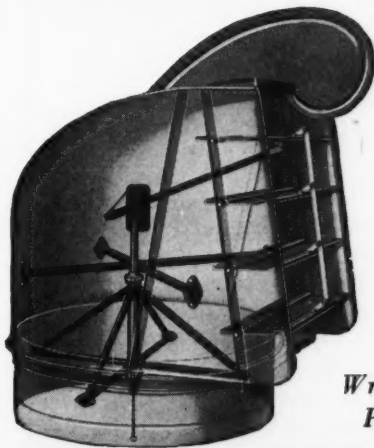
To any alert equipment dealer or gas company, a fertile field for NEW SALES is presented by the RIGHT Gas Pressure Regulator. A Barber Regulator is not a costly device, yet its value in fuel economy, safety, and "gas satisfaction" can be easily demonstrated. On your service calls, take several sizes of Barber Regulators along with you—and see how easy it is to place them.

Barber Regulators are built to the highest standards of precision, and operate to 3/10 pressure drop. All bronze body, brass working parts. Sizes 1/4 to 1 1/2 inches, tested and certified by A.G.A. Testing Laboratory. These regulators are well-styled and appropriate to the modern trend in range and heating equipment design. On appliances you sell, sponsor, or make, a Barber Regulator is a mark of Quality merchandise.

Attractive folders on this Regulator will be furnished free, at your request, for distribution to your trade. Write for catalog and price list on Barber Burner Units for Gas Appliances, Conversion Burners for Furnaces and Boilers, and Regulators.

THE BARBER GAS BURNER CO.
3704 Superior Ave., Cleveland, Ohio

BARBER GAS PRESSURE REGULATORS



Write for
Prices

7 SUPERIOR FEATURES

1. Low slung vane—less overall height—enhances appearance and holds ventilator absolutely steady in the wind.
2. New curved body—essentially modern lines. Provides the ultimate in efficient operation with minimum air travel friction.
3. Elliptical steel tubing interior members *welded* into a one-piece frame—the strongest and most rigid construction known. Impossible to disjoint.
4. Oversize outlet—provides extra large capacity under all operating conditions.
5. Wind play on *three* sides of opening—*three-fourths* of discharge area (much more than on ventilators of other types)—gives greatest possible suction effect from outside wind currents. You get more capacity per size.
6. Stainless steel ball bearings in small-size fully enclosed dust-proof housing—assures a life time of trouble-free operation—and *no lubrication required*.
7. Outside Louver Dampers never let dust fall into the building.



The **NEW**
Swartwout
ROTARY
BALL BEARING
VENTILATOR

THE SWARTWOUT COMPANY
18615 Euclid Ave. Cleveland, Ohio

New Products

For your convenience in obtaining information regarding these items, use the coupon on page 98.

•115—Ductatherm

The Mercoid Corporation, 4201 Belmont Ave., Chicago, announces a new and compact temperature control, designed especially for the control of temperature in air conditioning ducts. Also used as a limit or fan control for warm air furnaces. There are many



other industrial applications, such as drying ovens, baking ovens and for temperature control of air and gas not injurious to brass.

The Ductatherm is very small in size. It is actuated by a small and

very sensitive bimetal spiral, located on the end of the control stem, which projects into the duct or chamber where accurate and dependable temperature regulation may be maintained.

•116—New Gas Humidifier

The Bryant Heater Company of Cleveland announces a new low cost, gas-fired humidifier, designed to maintain the desired humidity conditions in the home, regardless of the type, and entirely independent of the operation of the existing heating system.

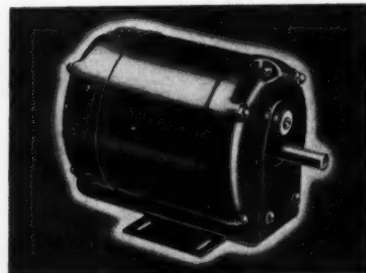
Ratings of the humidifier include: evaporating capacity of 15 gallons per day; gas input of 20,000 b.t.u. per hour; air capacity of 200 cubic feet per minute and a fan motor of 1/60 horsepower.

The unit measures approximately 47 inches in length, 18 in width and 15 in height. It is designed to hang from the ceiling by strap hanger supports.

Inasmuch as the air is preheated, the unit delivers a flow of warm, comfortable air, the final discharge temperature being approximately 125 deg.

117—Belt-Tightening Motor

The Ohio Electric Mfg. Co., 5910 Maurice Ave., Cleveland, Ohio, is introducing a special belt tightening de-



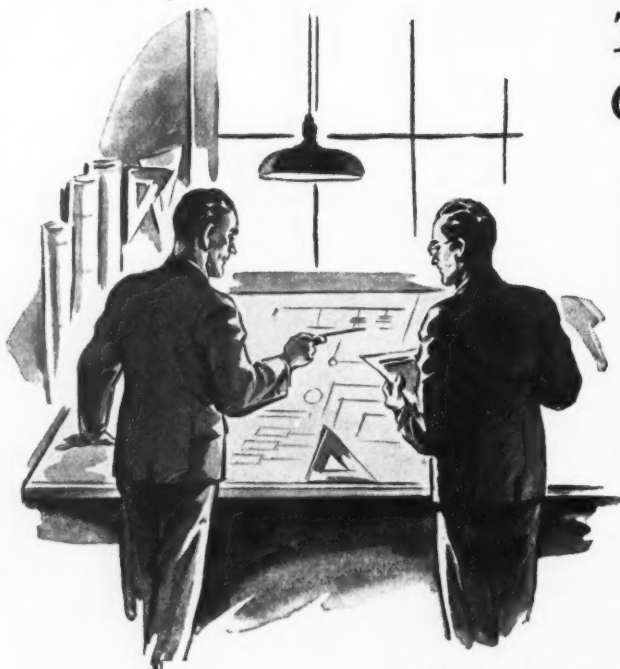
sign for over-drives such as furnace blowers where the belt must pull on the top side of the pulley so the air will be driven into the bottom of the furnace.

The motor is supported above and off the shaft center so its own weight provides the initial belt tightening effect, but this is increased proportionally to the load by the reaction of the rotor to the stator causing the motor to swing away from its load and so tighten the belt just the proper amount.

The company is also introducing a belt tightener without springs for under-drive belts such as are usually employed for driving pumps and compressors. In these the motor is resiliently supported off and below the shaft center.

Ask the AEROFIN Man

*To Help You on Your
Cooling or Heating Problems*



Aerofin Corporation, through its home office and six strategically located branch offices, is prepared to help you on all problems involving the application of Aerofin heat exchange surface or to suggest the most efficient use of this superior surface to a variety of requirements.

The prompt, personal and technical cooperation of our engineers is at your disposal. Write to the home office in Syracuse or consult your local telephone directory for addresses of branch offices listed.

AEROFIN

Heat-Exchange Surface

AEROFIN CORPORATION

410 SOUTH GEDDES STREET, SYRACUSE, N. Y.

Chicago • Detroit • New York • Philadelphia • Dallas • Atlanta



**BROKEN
RECORDS**
*Put Money in
Your Pockets!*



PET
OIL BURNER

**BREAK ALL RECORDS FOR
LOW-COST PERFORMANCE**

NEEDS LEAST SERVICING...

For low cost efficient performance and dependable operation, choose the PET for your oil-fired heating equipment. PET is compact—adaptable to fit any space in furnace casings—extra-heavy to eliminate vibration and noise—and is simplified in construction. Advanced engineering—precision manufacture by one of the world's largest makers of gun-type oil burners guarantees a minimum of servicing.

**COSTS MUCH LESS TO
SERVICE**

The minimum service required by the PET is quick, easy, and economical. Removal of one screw gives access to electrical assembly—blast tubes, fans, nozzles, fuel pump and motor easily removed. A screwdriver and one wrench is all that's needed to disassemble entire burner. Can be entirely dismantled, serviced, and reassembled in just a few minutes.

**ALDRICH SELF-
CLEANING FAN**

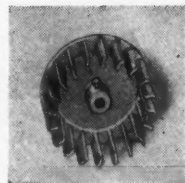
Can't collect dirt and change air adjustment . . . peak performance always.

**NEW A. C. FUEL-PAK
FUEL UNIT**

Makes all other fuel units obsolete. Outlasts a dozen ordinary pumps. Nitrated gears—next to a diamond in hardness. Pump removed without breaking seal. Easier than cleaning a strainer.

WRITE
FOR FACTS
TODAY

ALDRICH COMPANY
PEORIA, ILLINOIS



Streamline, cast aluminum fan—self cleaning type, can't get out of adjustment.



Pump totally enclosed in compartment—can't leak on floor.

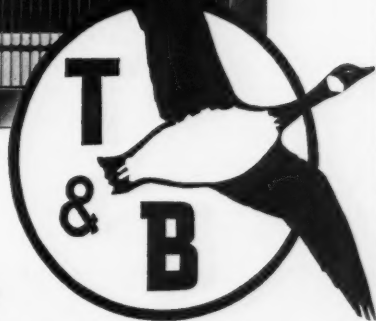


Pump removed (below). Slips on and off shaft easily. No replacement delay . . . easier than cleaning a strainer.



As Fatima used
to say—

*"What a
Whale of
a Difference
a Few Cents Make!"*



Look at it this way! The cost of the Tuttle & Bailey Airline Register over the cost of the cheapest air conditioning register you can buy is measured in **CENTS**—and consider the difference in the product! You get the scientific fixed air deflection of the famous Airline—the good looking modern appearance of the Airline—the strong, sturdy construction and the close mesh of the Airline. Remember the register is the part of the whole air conditioning system seen most often by your customer.

If the job demands the smallest possible expenditure for registers—investigate the Tuttle & Bailey Economair—an excellent register in the very lowest price class—but remember, that for a matter of a few cents more per outlet you can have the Airline—the Standard of Comparison.

Send for Catalog No. 38 R

Tuttle & Bailey, Inc.

New Britain, Conn.

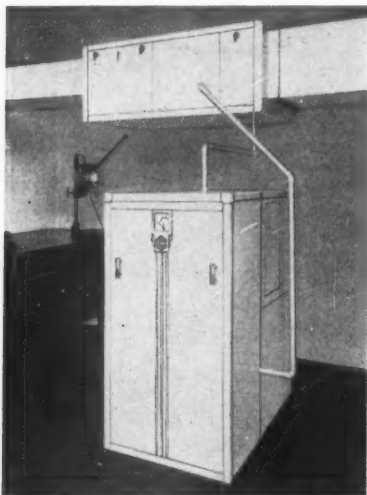
New York — Chicago
Boston — Philadelphia

New Products

For your convenience in obtaining information regarding these items, use the coupon on page 98.

118—Split System

Electrol Incorporated, 934 Main Ave., Clifton, N. J., manufacturer of home conditioning equipment, has introduced the Suspended Split-System. This model is precision made and beautifully engineered, with baked enamel finish, in three sizes and with ample capacity for homes ranging from 6 to 8 rooms or for conditioning several



rooms in larger homes. It provides the same flexibility of air conditioning service that is supplied by the Electrol Floor-mounted Split-System for the large home.

Attached to the ceiling in the basement, this conditioner conserves space, and its appearance lends an attractive atmosphere to the basement. It can be installed in existing structures or in new homes. It is designed for use in conjunction with any automatically oil-fired steam or hot water boiler.

This equipment adds humidification, air cleansing and circulation in the winter months; it can also be used in the summer for the circulation and cleaning of the air. Coils can be installed for the circulation of cold water or refrigeration to provide cooling during warm weather.

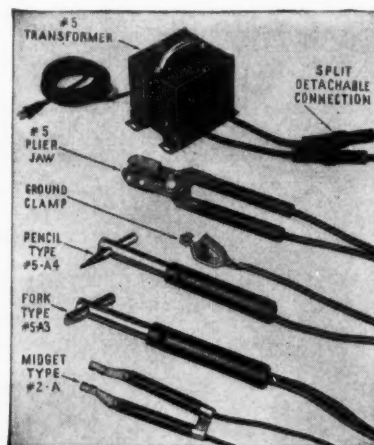
119—Electric Soldering Unit

Ideal Commutator Dresser Co., 1084 Park Avenue, Sycamore, Illinois, has recently introduced a new all-purpose "Deluxe" Thermo-Grip soldering unit for all types of soft soldering work. Operating electrically, the unit eliminates the necessity of an open flame.

The complete soldering unit consists

of a transformer and four heads or tools:

A Midget type head is especially



adaptable for small and lighter soldering and for use in restricted spaces.

For more common soldering work the Standard type head is recommended.

The Fork type head is handy for heating small lugs, terminals and connections where it would be impossible to reach with other tools.

The Pencil type head is adaptable for soldering seamed joints, spot soldering, and for getting into tight places.

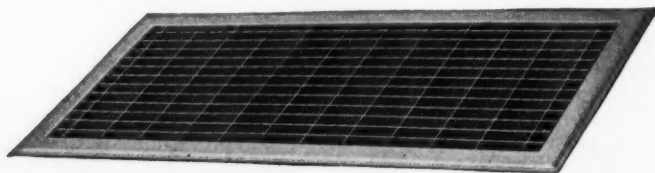
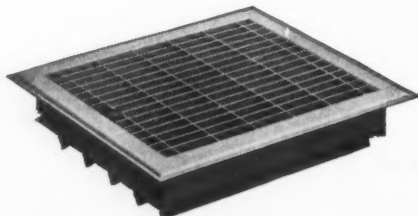
On soldering jobs where speed is particularly necessary, a new foot-operated switch is available. This may be used with all Thermo-Grip tools.

When Plenty of Strength Is Needed, Use

DuraBilt Registers and Intakes

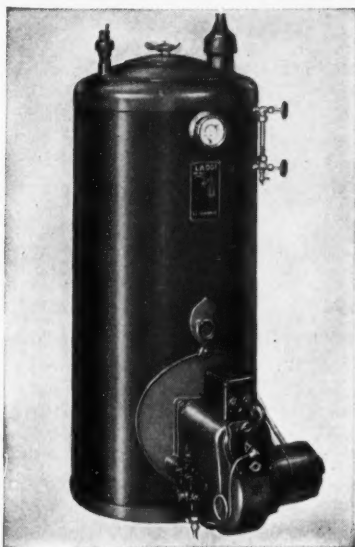
Auer DuraBilt Floor Registers and Cold Air Faces are engineered and built for strength and rigidity. Constructed of steel cross-bars, every cross-joint mortised and locked. Every end joint interlocked to frame. Ample free air flow in either DuraBilt Intake standard mesh or narrow mesh. In DuraBilt models, better craftsmanship, faultless design and finish, **COST YOU NO MORE!**

Send for complete Auer Register Book 38, illustrating these and many other Registers, Intakes, and Grilles for both gravity and air conditioning.



THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

AUER DISTINCTIVE **REGISTERS**
& GRILLES  **For Air Conditioning and Gravity**



LADDI DU-ALL

A compact and complete automatic unit furnishing hot water for medium size apartments, heat or both heat and hot water for small and medium size homes at low initial cost.

JOHNSON

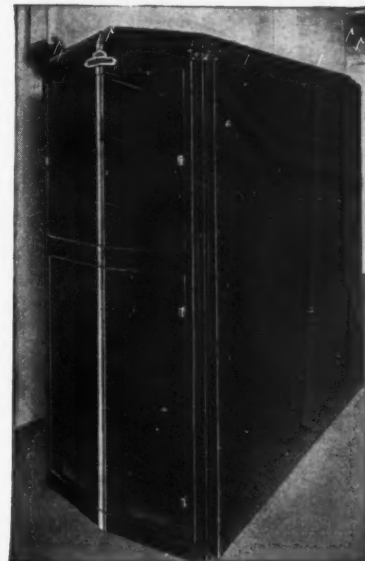
A COMPLETE LINE OF
OIL BURNERS
for every need of home or industry

Worthwhile territories and Johnson franchises available to aggressive dealers anxious to serve their communities with a complete line. Write today giving full details as to qualifications.



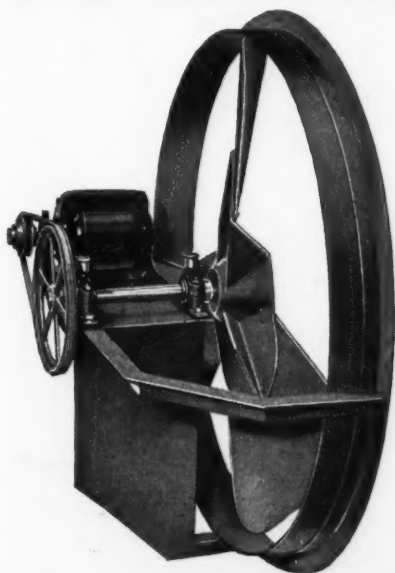
S. T. JOHNSON CO.

940 ARLINGTON, OAKLAND, CALIFORNIA
401 N. BROAD ST., PHILADELPHIA, PA.



SELECTAIR

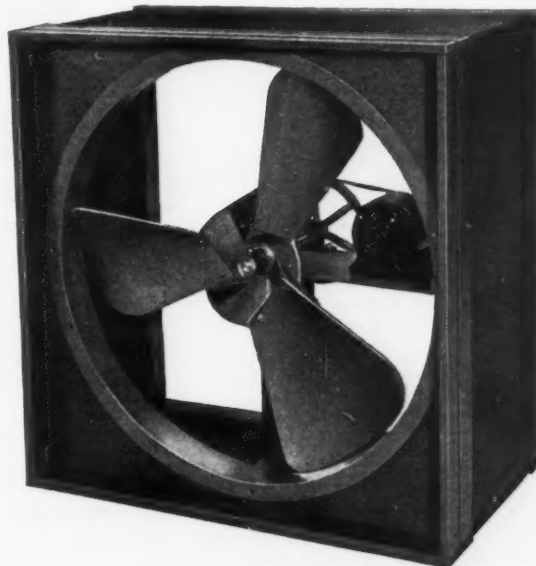
Compact, dependable, this split system air-conditioning unit offers every desired feature for economical heating, air-conditioning and ventilating the home. With year-round domestic hot water. Oil-fired by the Johnson Pressure Type "Bankheat" Burner.



A New Sure-Fire Sales Plan That Sells NITEAIR ATTIC FANS

A sales plan that is radically different . . . a sales plan that has been tested and has proven its merit by increasing NITEAIR sales to almost unbelievable proportions. Every home owner is a live-wire prospect for this efficient and economical method of summer cooling. Don't delay, write now for full particulars about this revolutionary sales plan!

Operation cost . . .
performance data . . .
dimension charts and
other valuable data
included in the new
NITEAIR catalog—
just off the press. Your
copy will be mailed
on receipt of your re-
quest.



Complete With All Accessories

- A complete range of sizes for every requirement—30-inches to 42-inches.
- Niteair capacities—5,000 to 11,000 cubic feet per minute.
- Automatic or stationary louvers.
- Free area grilles of sufficient face area.
- Automatic control . . . requires no current . . . never needs winding.
- Suction box.
- Quickly and easily installed.

The Lau Blower Company
Dayton, Ohio

New Products

For your convenience in obtaining information regarding these items, use the coupon on page 98.

120—Sandwich Roofing

Carnegie-Illinois Steel Corporation, Carnegie Building, Pittsburgh, announces a copper-steel "Sandwich" roof designed for their new Irvin Works. It is built like a sandwich with insulating material clamped between.

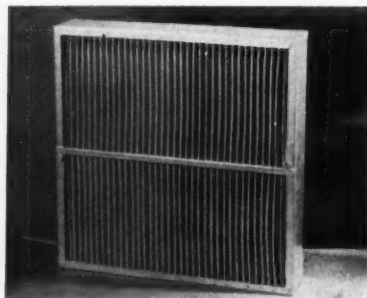


The bottom layer consists of 22-gauge copper steel black sheets, 2½-inch corrugated. The insulation is ¾ inch gypsum with a thin layer of aluminum foil on the outer surface. The top layer consists of 18-gauge copper steel black sheets, also 2½-inch corrugated, painted on both sides.

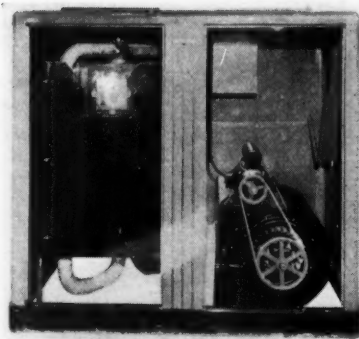
For the siding, the inside layer of sheets consists of 24-gauge copper steel, 2½ in. corrugated black sheets painted, with ¾ in. gypsum insulation and aluminum foil on the outer surface. The outside layer consists of 20-gauge corrugated sheets. The interior partitions in the mill are "sandwiches" consisting of the ¾ in. insulation between layers of 24-ga. corrugated copper steel black sheets, painted.

121—Wire-Klad Air Filter

Staynew Filter Corporation, manufacturers of Protectomotor products, announces a new dry type air filter with the particularly desirable feature of flame-resistance—fulfilling the provisions set forth in Section 150 of the National Board of Fire Underwriters.



The descriptive name, Wire-Klad, refers to the wire mesh reinforcement of the fins. The fin construction affords large filtering area in relatively small space. The wire mesh reinforces the filtering medium so strongly that the filter can be cleaned indefinitely by high pressure air or vacuum. Several filtering media are available.



122—Warm Air Conditioner

The General Electric air conditioning department, Bloomfield, N. J., has added a newly designed oil furnace and an oil-fired warm air conditioner, both with a rated output of 160,000 Btu per hour. G-E oil furnaces are already available with ratings of 100,000, 133,000, and 275,000 Btu, and warm air conditioners have been produced in 100,000 and 133,000 Btu sizes.

The controls include a master control and integral flame detector mounted inside the jacket, and a limit control mounted on the domestic hot water coil housing.

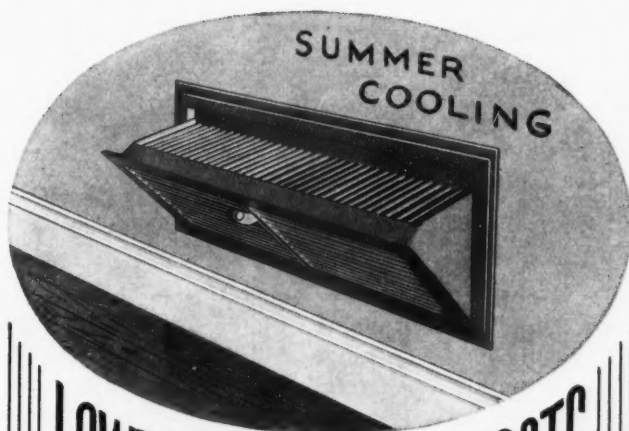
Jacket styled by Ray Patten.

The new oil-fired warm air conditioner consists of a combustion-heat-transfer unit, an oil burner unit, and aphonics radial flow fan, filters, and controls, enclosed in a gray cabinet with black and chrome trim.

CONCO

A Big Value in Domestic and Heavy Duty Stokers. Tie up with this Dependable Equipment. Full information yours for the asking.

CONCO-SAMPSEL STOKER CORPORATION
DIVISION OF H. D. CONKEY & COMPANY, MENDOTA, ILL.
BOX 111A



LOWER INSTALLATION COSTS with the NEW "All Season" Combination A-C Register

PATENTED

The "ALL SEASON" COMBINATION REGISTER reduces installation costs to a minimum on new or change over jobs.

Saves cutting into sidewalls—allows for use of existing duct systems with no changes or additions.

For winter heating the grille bars are set at 22° downward to allow for uniform air flow across the floor. For summer cooling the grille bars are individually adjustable to provide easily and quickly any air deflection required.

For use on every fan or blower heating installation for partial summer cooling and to provide for future addition of complete mechanical cooling.

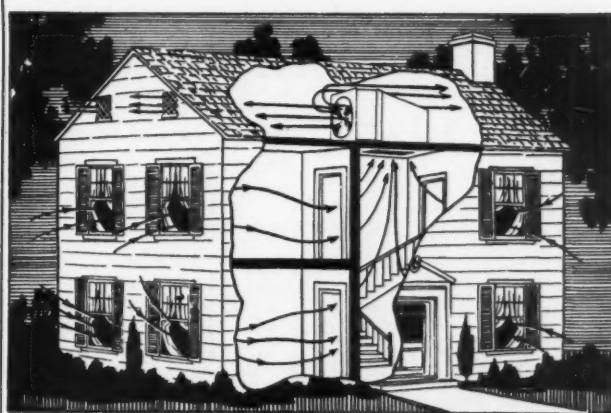
Available in both flush wall and baseboard replacement types.

Ask your jobber or write for Catalog D-4



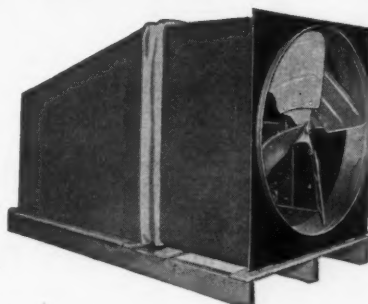
ECKENROTH REGISTER CO. INC.
447 SUTTER ST. SAN FRANCISCO. CALIF.

NO OBJECTIONABLE DRAFTS



No Extras to Buy!

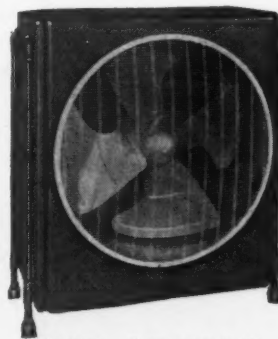
REX-AIRATE Attic Ventilators
are Complete, Ready to Install!



**Greater
Sales!**

**Greater
Profits
for You!**

Attic ventilation is sweeping every community. The demand for relief from blistering summer heat is increasing by leaps and bounds. Take advantage of this big profit market. Sell REX-AIRATE and give your customers an attic ventilator that really does the job. Complete, ready to install with fan units, all metal vent-box, automatic ceiling shutters, canvas connector and ceiling moulding.



42" high. Circulates 7,000
Cu. Ft. Air per minute

• Forget for a minute about the tremendous market for attic ventilation, and concentrate on the hotels, beauty parlors, restaurants, theaters, cafes, bars and food stores—they all need REX-AIRATE Comfort Cooling . . . brings in fresh outdoor air, drives out heat . . . plugs into any electric socket, can be moved from place to place. Handsome in appearance, low in first cost, economical to operate.

There's No Time to Lose! Mail the Coupon!

AIR CONTROLS, INC.
Div. of The Cleveland Heater Co.
1933 West 114th, Cleveland, Ohio

NAME

ADDRESS

CITYSTATE.....

A. A. 6-38

Easy Installation and Dependable Performance



For a Warm Air Furnace Equipped with a Blower

You can be sure of these two things when you sell the Cook 218 Central System for a warm air furnace equipped with a blower.

First—it will perform efficiently, operate safely and at low cost. Experience proves it!

Second—installation is simple, easy and inexpensive. The system comprises the thermostat, the central control box which is arranged for easy wiring and the bonnet switch which includes limit, fan and safety switches all in one unit.

Find out what the 218 is, what it will do and what it's worth to you in sales volume and profit. Write today for complete information.



COOK CONTROLS

THERMOSTATS—FURNACE LIMIT CONTROLS
ZONE CONTROLS—BLOWER CONTROLS

COOK ELECTRIC CO.

2676 Southport Ave.

CHICAGO

Resistance Welding

(Continued from page 33)

of the metal on cooling some surface distortion will be noticed.

High-Carbon Steel Requires Annealing

Another steel alloy which is sometimes considered for spot welding is high-carbon steel. This metal can be resistance welded, but unless the weld is promptly and carefully annealed it will be of such a brittle nature as to be useless. By using very long welding periods and relatively low current values, the effect of annealing may be simulated, but in relatively few instances has quantity production permitted such long welding periods. In general, high-carbon steel has not been successfully fabricated by the spot-welding method.

The purpose of these articles has been to point out some of the factors that influence resistance welding. In general, sufficient information has been given to determine whether a given machine can be used to do a certain job. It is hoped that these articles have convinced production men that the selection and maintenance of the resistance-welding machine deserves the same care and thought as any other production machine. It is only by a knowledge of the factors which influence resistance welding that the art can progress, and it is hoped that these articles will help to that end.

Drop Ceiling System

(Continued from page 45)

The total heat loss of the house is 69,178 Btu per hour. The average register air temperature is 135 degrees. The blower is set to deliver 2,125 cfm against 1/8-inch static and can be increased if desired. All warm air pipes are sized according to the Green Foundry & Furnace Works code which combines velocity and resistance factors. The capacity of the furnace is 89,250 Btu per hour at the registers.

The installed price of the winter air conditioning system was \$425.

King Ventilating Officials

Fred Gallagher, for many years with King Ventilating Co., of Owatonna, Minn., has been elected president of the company, succeeding the late William B. Clarkson. Robert Nelson was elected Vice President; Andrew Wodarczak was elected treasurer; G. A. M. Anderson, secretary, and Sam Lord, director. The company is expanding its line.

Spring Campaign

Bluff City Sheet Metal Works, of which A. H. Hanson is the head, located at 676 Madison Ave., Memphis, Tenn., put on a spring campaign on warm air heating plants. The firm has a cosmopolitan field of activity in sheet metal work, roofing, skylights, blow piping, guttering, etc.

Announcing!

LONGLIFE MONCRIEF FURNACE



... with **20** year Guarantee

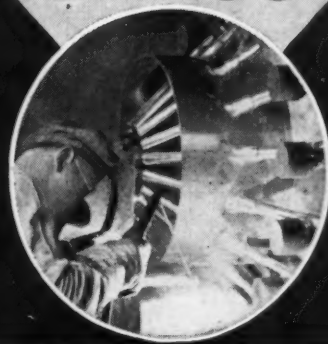
The new LongLife adds further to the completeness of the Moncrief line and gives Moncrief dealers additional opportunities to increase business and profits. The 20-year LongLife guarantee gives the home owner positive assurance of durability and uninterrupted service. Send for specifications and prices.

THE HENRY FURNACE & FOUNDRY CO.
3473 E. 49th St., Cleveland, Ohio

Manufacturer of

- Cast and Steel Furnaces.
- Winter Air Conditioners in specialized types for Gas, Coal and Oil.
- Pipe, Fittings and Accessories for both gravity and air conditioning systems.
- Automatic Humidifiers.
- Moncrief Blower-Filter Units.

STAINLESS STEEL ALUMINUM COPPER BRASS



It's nice work if you can weld it and you can weld it. Here's how—

STAINLESS STEEL—Use
Lincoln "Stainweld" Electrode ... } with the
"JUNIOR"

ALUMINUM—Use
Lincoln "Aluminweld" Electrode ... } with the
"JUNIOR"

COPPER AND COPPER ALLOYS—Use
Lincoln "Aerisweld" Electrode ... } with the
"JUNIOR"

STEEL SHAPES—Use
Lincoln "Fleetweld" Electrodes ... } with the
"JUNIOR"

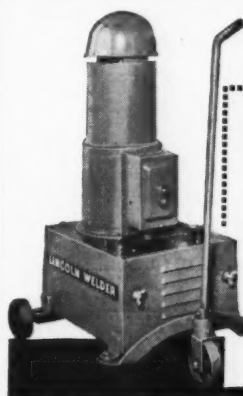
SHEET STEEL—Use
Lincoln "Lightweld" Electrode ... } with the
"JUNIOR"

CAST IRON—Use
Lincoln "Ferroweld" Electrode ... } with the
"JUNIOR"

Hundreds of shops have expanded their business and cut their fabrication costs up to 50% with this LINCOLN WELDING combination. You can get these profits with an investment cost of less than \$200. Mail the coupon for details.

THE LINCOLN ELECTRIC COMPANY

*Largest Manufacturers of Arc
Welding Equipment in the World*



THE LINCOLN ELECTRIC CO.
Dept. EE-500, Cleveland, Ohio

Send details on Lincoln equipment for sheet metal profits.

Name _____ Position _____
Company _____
Address _____
City _____ State _____

PRICE

Alone Is Not Enough—

STOKER-OLA

OFFERS BEAUTY . . . QUALITY . . . EFFICIENCY . . .
SIMPLICITY . . . HIGH SALABILITY . . .
PLUS LOW PRICE

\$189⁵⁰

COMPLETE WITH MINNEAPOLIS-HONEYWELL
CONTROLS

And Stoker-Ola's World Famous GEARLESS DRIVE

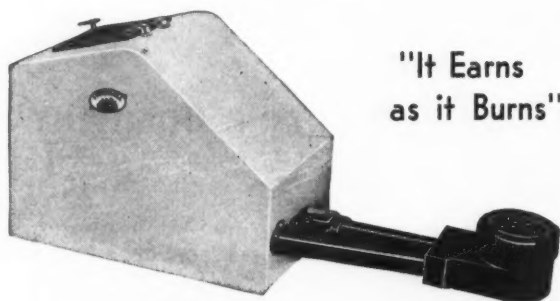
An Outstanding Feature That Makes Stoker-Ola America's
Most Easily Sold Stoker

No Gears Mean

- More Power
- Less Current Needed
- Only 2 Major Working Parts
- Unlimited Coal Feed Settings
- No Oil Changing
- No Oil Leaks
- No Gear Case
- Costs Less to Maintain
- Built to Last Longer
- Quality Throughout

• Proof: 3-Year Guarantee

WE REPEAT: STOKER-OLA IS AMERICA'S GREATEST
STOKER VALUE!



"It Earns
as it Burns"

Model A-4

Burning Capacity:

Max. 40 lbs. with unlimited coal-feed control.

ecome "THE man to see before buying ANY stoker"—build a repu-
sation on PERFORMANCE and VALUE—it's the kind that will make
ou money through the years.

Write us today on your letterhead for either
our Distributor or Dealer Proposition

Advance Appliance Co., Inc.
08 S. Washington St. Peoria, Ill.

80

Attic Ventilation

(Continued from page 59)

cepted by all of the cooperating dealers and adver-
tised as a means of comparing suggested systems
and results. Very quickly this proposal gained
public acceptance and contractors who did not use
the proposal form very frequently lost jobs to
others who did use the form.

Engineering Problems

From an engineering angle, New Orleans is of in-
terest as conditions are severe. The summer rela-
tive humidity is very high compared to other parts
of the United States, but the temperature is not.
The summer temperature very rarely reaches 100
degrees in New Orleans. After six or seven in the
evening the temperature drops to 80 to 85, but day
or night the relative humidity seldom drops below
50 to 60 per cent and oftentimes is much higher.
Houses, even of the better type, are seldom insu-
lated; stucco or weather board on studs without
building paper or sheathing, wood lath and plaster
is typical construction. Because New Orleans is
below the river level, there are almost no base-
ments and a tremendous percentage of houses are
built off the ground, or paved beneath as rat pro-
tection.

Practice shows that a minimum of 250 feet per
minute air movement is required for any comfort
effect so systems are designed on that basis. All
windows are left open; air flow through rooms is
controlled by opening or closing doors. One air
change per minute is considered the minimum; one
and one-half is sought and many installations have
fans capable of providing two air changes per min-
ute. Twin or multi-fan jobs are most popular now
—the owner can operate all fans during the daytime
and reduce the operation to one fan at night.

Engineering Information

In the way of advertising material for use by
dealers the Public Service company printed a book-
let "Installation Recommendations on Attic Venti-
lation" explaining the underlying principles of the
idea, showing recommended fans and fan housings,
details on grille construction, proper design of eave
or gable louvres, a schedule of fan openings in ceil-
ings and exhaust openings, a table of fan sizes and
approximate costs, and other pertinent data. For
those who desired air conditioning a booklet show-
ing all the units sold locally with data and dealers
was printed. Typical newspaper advertising is
shown.

Southwest Welding Has Contract

The Southwest Welding and Manufacturing Company, of
Alhambra, Cal., was recently awarded the contract for,
and has obtained a building permit to erect, a huge steel
water storage tank at 209-213 Larson street, Manhattan
Beach, Cal., at a cost of \$12,000.



Single Beading Rolls

O. G. Beading Rolls

This New Niagara Beader

Has What It Takes
for Heavy Duty Work
on Ventilators, Heavy Cans, Stacks, etc.

You will make light work of heavy beading on sheets up to 18 gage. Geared drive for easy operation at maximum capacity . . . heavy, one-piece, rigid frame . . . enclosed gears and shafts . . . hardened steel rolls . . . adjustable gage . . . quick-acting crank raises and lowers upper roll. Write for Booklet on complete line of machines and tools for your sheet metal shop.

Niagara Machine & Tool Works
BUFFALO, N. Y.

CLEVELAND, O. DETROIT NEW YORK

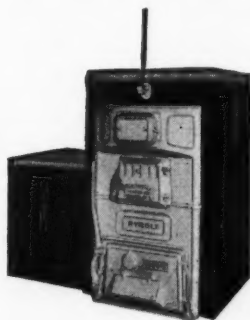


Pulley for Power Operation Available

Patented

SUMMER TIME IS PROFIT TIME

At right. The Series 157 Winter Air Conditioning Unit.



. . . for all those wideawake heating and air conditioning men who don't allow the so-called summer slump to stop their business getting efforts. This is just the time of year to get after homeowners who have old heating plants in need of repairs or replacements. You'll find it easy if you'll just get started. The past winter has probably convinced many a prospect of yours that he needs a new furnace or at least extensive repairs.



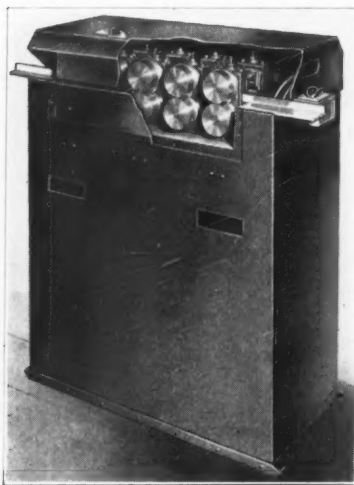
At left. The Series 600A7 Winter Air Conditioning Unit.

There's the spot for you to step in with the RYBOLT line . . . show him the Series 600A7 and 157 Air Conditioning Units, the new gas winter air conditioner and the well built line of cast and steel furnaces. There is a unit to fit his particular need, and most important . . . his pocketbook.

You'll be high on the list of successful merchants in your community if you follow this formula. Get after 'em NOW and make *real* money this summer. Write us TODAY for further information.

The RYBOLT HEATER COMPANY, Ashland, Ohio

Handle More Jobs at Greater Profits with a **KOR-NER-LOK** FORMING MACHINE



TAKE them as they come; turn out Pittsburgh locks — 30 feet per minute . . . for rectangular pipes and fittings—for heating, ventilating, and air-conditioning work. . . . With the No. 22 Machine save up to 50% on duct work, alone. . . . For heavier work you'll want the larger No. 20 or largest No. 18, illustrated.

You need a Binkley Kor-Ner-Lok Forming Machine NOW—to bid closely and still make good profits.

MADE IN SIZES
TO HANDLE 18-20-22 GAUGE
WRITE FOR BULLETIN A-3

BINKLEY MANUFACTURING CO.
WARRENTON MISSOURI

Mr. Jobber! —In 1938 Mr. Dealer!

If You Want to Get the Job—
Quote

"HOME COMFORT"

And It's Yours.

- Absolutely Gas Tite Steel Furnaces
- Beautifully Styled Casings

- Extra Heavy Boiler Plate Steel Drums

- Blower — Either Side or Back

- Priced Below the Market

- In 1938 It's "HOME COMFORT"



*Don't Just Bid—Get the Job
Get Our Prices and Data*

"HOME COMFORT" FURNACE & MFG. CO.
2901-71 Elliott St. St. Louis, Mo.

With The Manufacturers . . .

Old Timer's Group

The Manufacturers' Association of Hartford County (Connecticut) gave a dinner recently for all employees with 40 years or more of service with one concern. Twenty members of the Peck, Stow & Wilcox Company attended. One member of this Old Timer's Group, Thomas Horan, 47, was



Peck, Stow & Wilcox Co. employees reading left to right, with years of continuous service with the company: Peter Hutton, 41; Edward Brown, 56; Harry Willis, 49; William Kline, 42; Daniel O'Brien, 41; Frank McHugh, 44; Michael Toomey, 54; Peter Mongillo, 41; Frank Booth, 45; James Scott, 69; Fred Ely, 45; John Connors, 46; Charles Trostel, 57; George Aspinall, 41; George Hubbard, 51; Louis Wolfe, 56; William Wendel, 41; Thomas Egan, 50; Daniel O'Keefe, 53; Thomas Flynn, 54.

unable to attend on account of illness in his family and is not included in the picture.

President Mark J. Lacey and assistant to the president, Edward G. Hackbarth, attended.

Over 600 forty-year-or-more employed people and executives of the different Hartford County Manufacturers attended. Two have worked for their same firms over 70 years and one man has worked for Peckto over 69 years.

Coast to Coast Dealer Meetings

Louis Schwitzer, president, Louis Schwitzer, Jr., vice-president, Walter Sormane, assistant director of sales, and Leroy A. Kling, merchandising counsellor, of the Schwitzer-Cummins Co., Indianapolis, have just completed a series of coast to coast dealer meetings.

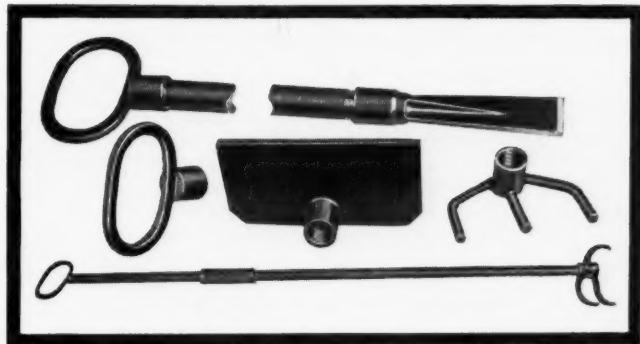
The first of these was held in Oshkosh under the auspices of John Pennau, Wisconsin distributor, on April 11. More than 100 Wisconsin Stokol dealers were present.

More than 8,800 miles were travelled between April 11 and the concluding meeting in Nashville, Tenn. on May 13. Mr. Schwitzer covered all but the trip from Denver to Seattle and return with his own plane and pilot. The others from the factory travelled a total of 4,300 miles by air, 3,850 miles by rail, and the rest by automobile. A total of approximately 1,500 Stokol dealers and salesmen were present at these meetings. The itinerary follows:

April 11—Oshkosh, Wis.
April 12—St. Paul, Minn.
April 13—Ames, Iowa.
April 14—Grand Island, Nebr.
April 15—Denver, Colo.
April 18—Seattle, Wash.
April 20—Salt Lake City, Utah.
April 22—Topeka, Kans.
April 23—St. Louis, Mo.
April 26—Indianapolis (Michigan at Indianapolis).
April 27—Indianapolis (Indiana).
April 28—Chicago.
May 2—Dayton, O.
May 3—Pittsburgh, Pa.
May 4—Dunkirk, N. Y.
May 6—Scranton, Pa.
May 7—Richmond, Va.
May 10—Greensboro, N. Car.
May 11—Knoxville, Tenn.
May 12—Birmingham, Ala.
May 13—Nashville, Tenn.

Stokol merchandising plans include sales training for the dealer, dealer meetings throughout the country, a talking slide film for retail selling, a \$25,000 national sales contest, a co-operative advertising campaign, and a comprehensive direct mail program.

NOW! A COMPLETE LINE OF FURNACE TOOLS by FARRELL-CHEEK



STURDILY constructed, the new line of Farrell-Cheek fire tools can really take it. Tough all the way through, they are built to give years of severe usage, with each part particularly designed for the conditions under which such tools are used.

Furnished in a variety of sizes, the slice bar, hoe, and fire rake are constructed of cast steel with welded pipe coupling for ready attachment to standard threaded pipe. Slice bars are available with blade widths from one to four inches. Hoes are constructed with thickness from 5/16 to 7/16 inches in various widths. Handles for these tools are of cast steel with welded pipe coupling.

Constructed in three sizes from 42 to 72 inches long, the new clinker tongs are designed for easy handling, sure grip and long use.

MANUFACTURERS AND DEALERS: Add the Farrell-Cheek line to your stock. Send in now for a sample order to round out your line. These items sell like hotcakes and they'll make you plenty of extra money.

FARRELL-CHEEK STEEL CO.
SANDUSKY OHIO



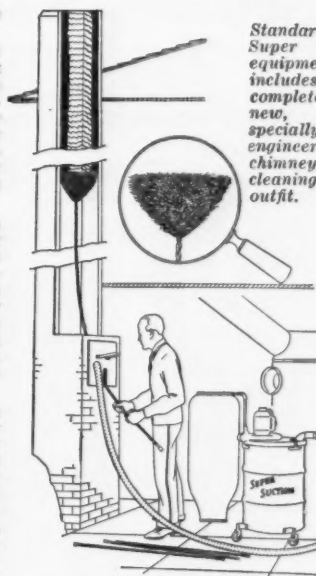
Picture of a Man Selling a New Heating Plant...

Sell plants and repairs the modern easy way.

Improved selling methods and advanced service equipment do bring bigger profits to you just as they do to manufacturer and service man in other industries. Up-to-date heating plant men use plant and chimney cleaning to get contact with plant repair jobs and new installations.

All over America today men in your business are selling new plants, parts, repairs while they are in the basement cleaning heating plants and chimneys with their Super Cleaners — big money jobs they never would have landed if they had not first talked to the prospect about inexpensive cleaning.

They make good money on the cleaning also when they use a Super—the only cleaner specially designed and tooled for your job. You clean 'em quick and thorough, from ash pit door to chimney top with the powerful Super Suction. Try it. Easy to sell cleanings. Our plan Book tells you how and you make the extra money you need today. Try a Super free.



Standard Super equipment includes complete new, specially engineered chimney cleaning outfit.

USE THIS COUPON

The National Super Service Company
1944 N. 13th Street, Toledo, Ohio

Send me the Plan Book and complete information about your free trial and the new low-priced Super.

Name

Street Address

City and State.....



**THE LARGEST, MOST COMPLETE LINE OF
SINGLE RETORT, UNDERFEED, SCREWFEED
STOKERS IN THE INDUSTRY . . .
*and the most profitable FOR YOU!***



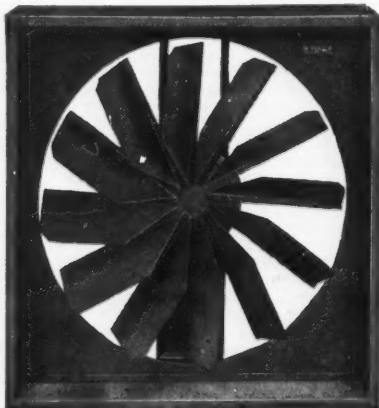
MODELS FROM 30
TO 1600 POUNDS
PER HOUR

WRITE FOR YOUR
COPY OF NEW
CATALOG '300

KOL-MASTER CORP., OREGON, ILLINOIS

BANISH HOT NIGHTS Boost Profits

Every home owner wants a cooler house in summer. Supply this demand with inexpensive Allen Attic Fan; it does the job quickly, inexpensively. Build your Summer Volume Up! Pulls off hot air at the top, giving cross-ventilation in every room,—one complete air change per minute. Instructions for installation and detailed diagrams supplied. Get action on this "Summer Special" PROMPTLY. Literature on request.



ALLEN ATTIC FAN (FRONT VIEW)

The ALLEN Corporation
9752 ERWIN AVENUE DETROIT, MICHIGAN

With the Manufacturers . . .

U. S. Steel Changes

C. R. Moffatt, formerly Advertising Manager, is now Director of Advertising of the United States Steel Corporation of Delaware, his successor being G. R. Schreiner.

Osborn Bowling League

A. W. Howe, President, J. M. & L. A. Osborn Company, Cleveland, was host at a dinner given May 17 at the Mid Day Club, Cleveland, to the members of the company's Bowling League. The league was comprised of six 6-men teams, comprising the office force, factory, shipping room and executive departments, and proper prizes were presented at the dinner, which officially closed the season.

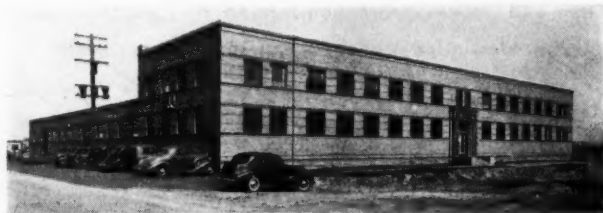
Wegner Named Sales Engineer

G. A. Wegner, Minneapolis, Minnesota, for many years identified with the control and accessory branches of both the heating and refrigeration industries, has been added to the factory staff of sales engineers of the Penn Electric Switch Co., Goshen, Indiana, according to an announcement by R. H. Luscombe, sales manager of that company. In his new capacity, Mr. Wegner will work out of the headquarters office of the company at Goshen, Indiana.

For several months Penn Electric Switch Co. has been carrying out a planned program of broadening sales engineering service to manufacturers, jobbers, contractors and dealers in the heating and refrigerating fields and the addition of Mr. Wegner to Penn's staff at this time is a continuation of this policy.

Marley in New Plant

The Marley Company, manufacturers of all types of water cooling equipment for industrial and air conditioning application, recently moved into their big new building at 3001 Fairfax Road, in Kansas City, Kansas. The main structure, 180 x 180 feet, houses the factory and warehouse on the



first floor with national headquarters offices on the second. It is equipped with a modern heating and ventilating plant, including 32 tons of air conditioning for the offices.

In addition, the company operates its own sales offices in New York, Cincinnati, Tulsa, Atlanta, and Los Angeles, with exclusive representatives in other large cities throughout this country and in Canada and Cuba. Officers include, L. T. Mart, President; W. R. Kell, Vice-President and General Sales Manager; J. C. Albright, Vice-President, and Miss E. M. Kelley, Secretary and Treasurer.

Revecon Price Reduced

Revere Copper and Brass Incorporated has announced a substantial price reduction in Revecon Extruded Aluminum Structural Mouldings.

This price reduction has been made to extend further the use of Revecon Structural Sections. These sections provide a simple, efficient medium for holding flat sheet materials applied to any type of superstructure with no exposed attaching device.

Revecon Structural Sections are stocked in Revere mills located in Baltimore, Chicago, Detroit, New Bedford, Massachusetts; Rome, New York, and Los Angeles. Full cooperation is extended to architects and designers through Revere's Architectural and Building Products Service, 230 Park Avenue, New York City, N. Y.



Now's the time to make next winter's sales for M-VB's "packaged humidification." It provides complete automatic water level control *all the time* . . . giving the proper, healthful amount of moisture to the home.

Four types of humidifier valves, carrying the famous M-VB trademark, cover all warm air furnaces. *And you can install any one of them in a half hour* . . . without dropping the fire.

Tell your customers that moving parts are clear of the water and can't corrode or stick . . . that a chromium-plated valve plunger seats against a special washer which will withstand unusually high temperatures. Show them how — for a few dollars — they can increase their furnace efficiency, with a substantial fuel saving.

Ask your wholesaler — now — to show you an M-VB humidifier package. It contains everything you need for the job. Or write to M-VB. We'll send you a free descriptive booklet.

Save Time in Installation — Time in Sales



SCOVILL
MANUFACTURING COMPANY

MORENCY — VAN BUREN DIVISION
STURGIS — MICHIGAN

Complete closet tank fittings and humidifier stocks also maintained at Waterville, Connecticut and San Francisco.

RANDALL PILLOW BLOCKS FILL EVERY NEED

There is a Randall Pillow Block for every air conditioning, furnace and blower requirement.

The Standard for light duty . . . The Rubber Mounted Standard for isolating vibrations . . . The D.R.O.R.—with two large oil reservoirs, enabling it to operate for long periods before

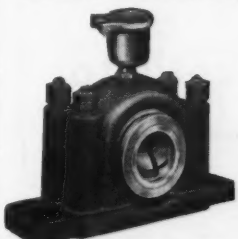
replenishing oil . . . The Universal, which mounts in any position and has the D.R.O.R. feature . . . and the Flange, for side mounting, which also has the D. R. O. R. feature. All D. R. O. R. pillow blocks are precision bored.



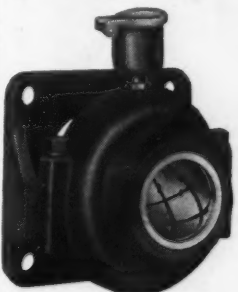
* Randall Standard Pillow Block (single reservoir)



* Randall D. R. O. R. Pillow Block (double reservoir)



* Randall Universal Pillow Block (double reservoir). Ball can be turned so that mounting can be made in any of four positions.



* Randall Flange or Side Mount Pillow Block (double reservoir). For mounting on cabinet type air conditioners and unit heaters.

* Shown with large special oiler.

Randall Pillow Blocks are self-aligning, self-lubricating and operate with a minimum running torque. They are noiseless, require no attention for long periods, and are now standard equipment on most air conditioning and blower units.

Randall Pillow Blocks are made in every needed size. Write today for new 1938 catalog.

PACIFIC COAST STOCKS

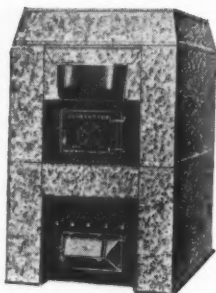
Utility Fan Corp. C. W. Marwedel
Los Angeles, Cal. San Francisco, Cal.

EASTERN STOCK

Tek Bearing Co.
177 La Fayette
New York City

Randall GRAPHITE PRODUCTS CORP.
Dept. 611 609 W. Lake St., Chicago, Ill.

QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS



BENEFACITOR FURNACE

A high quality welded steel furnace in three sizes, 22", 24" and 27", priced no higher than the ordinary cast-iron furnace. It gives unsurpassed value and opportunity for dealer profits.

The Hess Line is complete for every dealer requirement, including steel furnaces up to one million B.T.U. capacity, Blower Filter Units, oil burners, coal stokers.

FREE PLAN SERVICE

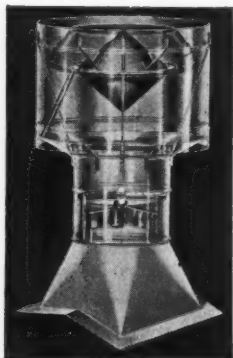
F.H.A. terms give dealer full payment in installment sales.
FREE Attractive consumer literature to help you make sales.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE. Founded 1873
CHICAGO, ILLINOIS

A New Roof Ventilator

by
BURT

**FREE-FLOW
FAN TYPE**



Again Burt superiority is demonstrated in this new fan type ventilator. It attains extraordinary efficiencies, moves air at lower costs than ever before. The "Free-Flow Fan" ventilator allows air to flow upward and out with the greatest freedom. Turbulence is eliminated—friction losses reduced to the minimum. Burt makes a type and a size for every purpose. Burt Engineers are glad to assist in estimating and laying out plans. Write for descriptive literature and data sheets.

The BURT MFG. Co.
301 Main St., Akron, Ohio

With the Manufacturers . . .

William Wiley Brooks

Wheeling Steel Corporation, Wheeling, W. Va., announces the appointment of William Wiley Brooks as district sales manager for the Atlanta territory, with headquarters in the Healey Building, Atlanta, Ga.

Dilman Witmer

Dilman Witmer, 60, a representative of W. C. Hopson Co., manufacturers and jobbers of tinners and roofers supplies, Grand Rapids, Michigan, died recently at his home, 625 Paris Ave., South East.

Improved Marketing Facilities

R. S. Reynolds, president of Reynolds Corporation, 19 Rector Street, New York City, announces that on April 22 Richmond Radiator Company, Uniontown, Pennsylvania, another affiliate of Reynolds Metals Company, with multiple warehousing facilities and widespread representation in the heating field, took over the manufacture and sale of air-conditioning equipment and duct systems formerly sold by Reynolds Corporation.

Ellis O. DeCamp

Ellis O. DeCamp, Vice-President of The Williamson Heater Co., Cincinnati, passed away on May 16th.

Mr. DeCamp was 64 years of age and had been connected with Williamson for over thirty-five years, serving in the sales, advertising, production and engineering departments. His father, A. J. DeCamp, had also held the office of Vice-President of the company. He was the author of many poems, some of them having been published in England and America.

Byron H. Edwards

Byron H. Edwards, one of the founders and president of the Ideal Furnace Company, Detroit, died Monday, May 30.

Originally in the hardware business, Mr. Edwards founded the old American Sadiron Co., and in 1898 entered the warm air register manufacturing field with the Detroit Register Co. Later these two companies merged into the Detroit Furnace and Heater Co. In 1903, Mr. Edwards founded the Ideal Furnace Co., which absorbed the American Sadiron Co., the Detroit Register Co., and the American Heater and Foundry Co. of Chicago.

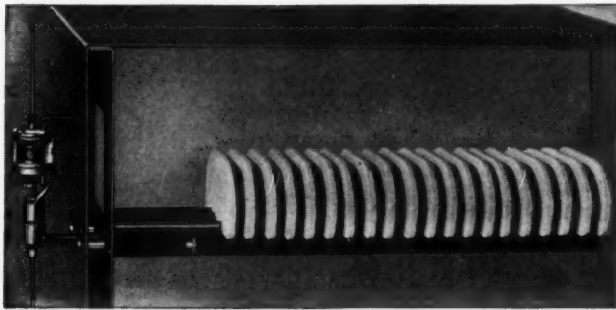
Surviving are two sons, Byron Ralph and Dwight Wallace Edwards of Detroit, and a daughter.

Meyer Furnace School

The Meyer Furnace Company, Peoria, Illinois, held a dealer conference and school at the Jefferson Hotel ballroom, Peoria, on May 2nd and 3rd with an attendance of 150.

The program included: Heat Loss Calculations by Frank L. Meyer; Design of Forced Air Trunk Line System—Plan D-1, by Ross M. Wallis; "Canned" Selling, by Frank E. Mehrings; Check Layout of Plan D-1 by R. M. Wallis; Design of a Forced Air Individual Run System Plan D-2, by R. M. Wallis; Installation Problems and Balancing the System, by F. L. Meyer; Furnace Cleaning, The Dealer's "Gold Mine," by F. E. Mehrings; Register Selection by R. L. Leigh; Controls by C. W. Nessel; Summer Air Conditioning, by A. R. Gilkerson.

Buffet luncheons were served each day, with a banquet on the evening of the first day. Wm. J. Bruninga was toastmaster, and R. B. "Dick" Bradley, humorist, was the speaker, followed by other entertainment.



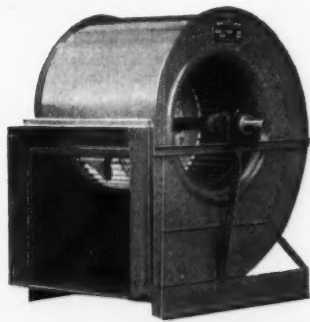
AUTOMATIC JUNE HYDRO-METRIC HUMIDIFYING SYSTEMS

A modern air conditioner deserves thoroughly modern humidifying equipment. In Automatic June, manufacturers are provided a complete humidifying system designed on fundamentally different lines. It gives controlled humidification, graduated in accordance with outside temperatures, adequate for every condition. Simple, trouble-proof. Send for literature and prices.

MONMOUTH PRODUCTS CO.

1933 E. 61st St., Cleveland, Ohio

Announcing



New GOLDEN ROD UTILITY BLOWER

Now available in a complete range of sizes from 9" to 24", either complete assemblies or as separate housings and wheels. For all Air Conditioning applications requiring from 500 to 20,000 C.F.M.

Contact your nearest Golden Rod distributor—or write direct to factory.

F. JADEN MFG. CO. INC. Hastings, Nebr.

Manufacturers of:

Package Blowers
Utility Blowers
Twin Blowers
Blower Wheels
Blower Housings
Blower Bearings

Unit Coolers
Unit Heaters
Central Air Conditioners
Unit Air Conditioners
Humidifiers

15TH YEAR *Everything to Gain*

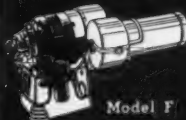
BRANFORD



Boiler-Burner Unit



Models A and E



Model F

COMPLETE LINE
FOR
ALL HEATING
CONDITIONS

OIL BURNERS

start you right, and a good start is vital

THERE'S no burner you can offer your customers that will give more dependable performance year after year than a Branford. There's everything to gain in starting right now with a Branford Franchise. We will help you sell, install and service. You get the full price immediately when the job is completed.

Write us for details

MALLEABLE IRON FITTINGS CO.

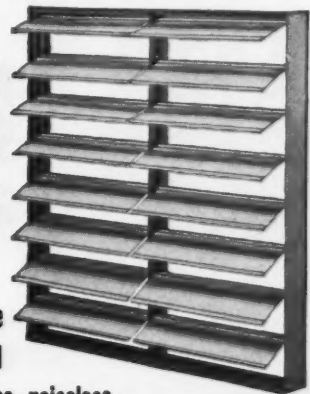
Serving the Heating Industry
for 74 years

DEPT.
42

BRANFORD,
CONN.



AMERICAN BACK PRESSURE DAMPERS



The outstanding back pressure damper—featuring ALUMINUM construction, felt stripped louvers, noiseless operation. Gives satisfactory service for small jobs as well as large ones. One installation will convince you. Specify and equip wherever possible with AMERICAN products and save service calls.

OTHER AMERICAN PRODUCTS

Warm Air and Ventilating Grilles, Multiple Louvre Dampers and Screens, Mixing Dampers, Fused Link Fire Dampers and Screens, Single Leaf Volume and By-pass Dampers.

THE AMERICAN WARMING & VENTILATING CO.

1017 Summit Street
Toledo, Ohio

663 Broadway
New York City

A Money Maker For Summer Time

When folks are hot under the collar, not because they are mad, but because it's so al-fired hot they can't sleep, then is the time you come up smiling.

You tell them about the Burnham Attic Cooler. How it reduced room temperatures 8 to 10 degrees.

You show them how it's that dead stored up hot air that keeps the room hot all night.

Then you prove to them how this Attic Cooler pushes out the hot air and pulls in the cool and you make a sale.

The Burnham Attic Fan Cooler comes to you a complete equipment, all ready for quick, easy installing.

Send for printed matter giving full facts. Get prices. See for yourself how easily you can make some extra money this Summer.

Bear in mind this cooler is backed by the Burnham reputation of over half a century standing.

Burnham Boiler Corporation
IRVINGTON, N. Y. ZANESVILLE, OHIO

Burnham Boiler

**HIGH
SPEED**
Shears

**TODAY'S FASTEST SHEARS
FOR PRODUCTION OF IRREGULAR
SHAPES FROM SHEET METAL**



No further finishing required, and absolutely accurate — easily operated. Equipment furnished for cutting outside and inside diameters of rings

without any machine change or adjustment.

Metal is sheared and not punched . . . unobstructed cutting vision . . . no starting hole required. No special cutters, pilots, templates, or strippers are needed . . . long life shear blades. Write for complete information.

LIBERT MACHINE CO. Green Bay, Wis.

Manufacturers of shears since 1915

Libert Hi-Speed SHEAR

News Items

Richards Adds to Lines

The Richards Manufacturing Company, 133 Front Avenue, N. W., Grand Rapids, Michigan, wholesale distributors of plumbing and heating supplies, will add a complete line of warm air furnaces, blowers, registers, controls, vacuum cleaners, sheet metal working machinery, pipe and fittings, and furnace accessories. They will appreciate correspondence with manufacturers who are in a position to supply the wholesale trade.

Firm Makes Progress

Memphis Gas and Electrical Appliance Co., 794 South Cooper, Memphis, Tenn., has recently been appointed exclusive dealer in Memphis for Reed Automatic Shut-O-Vent Attic fans. A fine show room display obtains on this line. The firm opened for business January 1, 1937. George L. Uetz, present head, is the founder. There is a staff of trained workers. The firm had the contract to start, adjust and service for the warranty period the 1086 Servel Electrolux gas refrigerators purchased by the Government and recently installed in the Lauderdale Courts and Dixie Home projects tenanted in February and March. It also does a large business in air conditioning, floor furnaces, washers, etc.

Nashville Home Show

National Home Show, at the Hippodrome, Nashville, Tennessee, was staged for one week in April, by the Nashville Real Estate Board cooperating with the Federal Housing Administration. The Realtors Transformation Home at 2810 Vanderbilt Place, to show how old houses may be made modern inside and out, was a further convincing demonstration. Various Nashville firms co-operated. Furnace and air conditioner features by Phillips and Buttorff Mfg. Co. Guttering and roof metal work by Burnette Roofing and Heating Co. T. J. Haile Jr. was the contractor.

Stock and Poultry Equipment

C. E. Carr and Co., 53 East Naghten St., Columbus, Ohio, has considerably expanded its sheet metal division recently. One of the new features is a new hog waterer and hog feeder, a development in galvanized steel. The new waterer with low founts, 100 gallon capacity and vacuum feed provides a serviceable unit that requires little attention other than the water supply. An inner tank is protected by a two inch air space, which keeps water cooler in summer and an even temperature in winter.

The feeders are manufactured in six, eight and ten foot lengths, with 23, 30 and 38 bushel capacity respectively. The firm now has five times more space at present quarters than in former years. It is a large manufacturer and distributor of sheet metal specialties. Its stock and poultry equipment is marketed in central Ohio through the hardware dealers.

Obituary

Otto Juttner, president of the Juttner Heating Co., of Milwaukee, Wis., died March 28, at age of 69, following a collapse in lobby of Elks Club, where he had made his home. He is survived by four brothers and three sisters.

Hugh Schwab, retired sheet metal contractor, died at his home, 645 South Graham, Memphis, Tennessee, April 24. He was 72 years of age.

Mr. Schwab was a member of one of the most prominent sheet metal firms in Memphis, Nohsey and Schwab, 230-32 Mulberry St., for forty-three years. Native of Lebanon, Ill., he came to Memphis half a century ago and immediately entered the sheet metal contract field. Surviving are his wife, Mrs. Marie Bell Schwab, and a sister, Mrs. Edward Mueller, of El Paso, Texas.

SELL Pacific

AND PACIFIC QUALITY WILL
KEEP YOUR CUSTOMERS SOLD

Write for details of the liberal Pacific
Dealer Plan and illustrated descrip-
tive literature showing the complete
line of up-to-the-minute Pacific Gas
Heating Appliances.

**Pacific
GAS RADIATOR CO.**

1740 W. Washington Blvd., Los Angeles, Calif.
Manufacturers of the Most Complete Line
of Gas Heating Appliances in the West

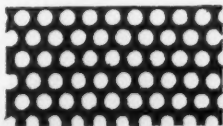
PERFORATED METALS

Many designs of Perforated
Metal for Architectural Grilles,
Radiator Enclosures, Air Condi-
tioners, Cabinets, Safety Guards,
and for all screening and sizing
operations.

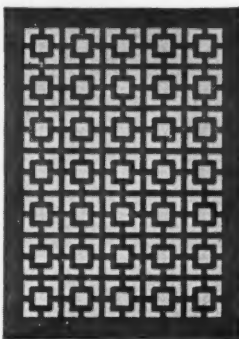
Steel, Stainless Steel, Brass,
Bronze, Copper, Monel, Alumi-
num, Zinc and other metals or
materials perforated to your
order.

Round holes from .020" to 7".
Slot holes from .008" to 3" wide.
Square holes of standard sizes.
Complete line of brass and tin
in small sizes. Prompt Service—
Pleasing Prices.

Send us
your next
specifica-
tions.



(Note: Equally spaced
holes make for uni-
form strength, im-
proved appearance and
durability.)

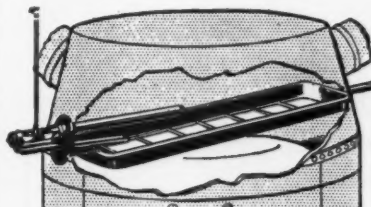


**The Harrington & King
PERFORATING CO.**

5649 Fillmore St., Chicago, Ill.

New York Office, 114 Liberty St.

Thermo-Drip Humidifier is Designed to do **2** Things



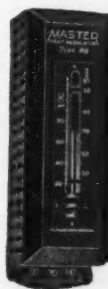
● With the heat-controlled water drip feature of the THERMO-DRIP Humidifier to talk about, it isn't difficult for you to convince home owners this is the best humidifier to install on their furnaces. Heat control tells them in simple language that, once it is installed, bonnet temperatures take over the job of regulating the amount of water fed to the vapor pan . . . that water feed need not be entrusted to instruments, mechanical parts or guesswork. ● More than that, heat control means vapor control—a vitally important advantage in humidification. THERMO-DRIP evaporates only the amount of water that the temperature-actuated valve is called upon to supply—no more—no less. And there is no fixed level maintained in the pan for all degrees of temperature. ● Here is a combination of powerful sales features that clinches sales . . . builds profits . . . for you. Write for particulars.

AUTOMATIC HUMIDIFIER CO.

18th and Main Streets

CEDAR FALLS, IOWA

TESTED AND PROVEN



No Master product is ever made avail-
able until it has been thoroughly tested
and proven to be worthy to bear the
Master name. The model B-22 has
proven its dependability not only in our
exhaustive tests, but in use under actual
operating conditions in the many years
it has been sold and installed all over
the country.

TYPE B-22

A two position heat regulator
that is ideal for the small
home. It is sturdily made and
dependability and precision
are built right into it. A noise-
less device that will outlast
the heating plant.

WHITE MFG. CO.

2362 University Ave.
ST. PAUL, MINN.



Made by the makers
of the famous Type
B-144, the original
gradual control heat
regulator.

MASTER HEAT REGULATOR

FURBLO...

SERIES 300



Sectional Construction
MAKES INSTALLATION EASIER!
ACCESS DOORS CAN BE PLACED ON
ANY SIDE DESIRED!

Write NOW for further information.

FURBLO CO., Hermansville, Michigan

How the CHAMBERLIN Automatic Humidifier

Gives You... Dependable Service
• Added Profits
• Satisfied Customers



YOU will get added profits by selling healthful, comfortable humidification at low cost to hundreds of home owners in your community. The Chamberlin is easy to install, fully automatic and fits any furnace hood.

The large water way through the patented integrally cast trap assures free flow without liming. A long float rod on the improved valve, which is entirely above the water line, gives positive water shut-off at any pressure. Cast entirely in one piece and finished in durable baked enamel. Vapor pan is 3" deep but carries only 1" of water to insure rapid evaporation.

Manufactured by a pioneer in this field, the Chamberlin combines dependability and attractive prices to make it a real business-getter for you. Thousands now in use. Write today for prices and free circular.

Manufactured by
CHANDLER COMPANY
Cedar Rapids, Iowa

News Items

Canadian Correspondence Schools

A campaign to curb the activities of disreputable correspondence schools offering courses in air conditioning and other engineering subjects has been launched in Canada, with indications that legislation will be enacted in furtherance of the program.

Active in the campaign to bring government action is the Toronto Better Business Bureau, which has previously issued warnings to the public to beware of certain correspondence school programs. The matter is also under close study by the department of education, according to Dr. Duncan McArthur, deputy minister of education.

While there are a number of reputable correspondence schools giving valuable training, others are only interested in collecting fees from \$150 to \$300 and make no effort to determine the applicant's qualifications for the courses subscribed for, explained A. R. Haskell, general manager of the business bureau. Reputable schools, Haskell declared, are careful not to sell their courses until they are satisfied that students are qualified. A position "guaranteed" upon completion of a course is the prize in the high-pressure correspondence school's bag of tricks.

A governmental order making it possible for a student to pay for only those lessons he has taken, and not for a full course, is Haskell's recommendation to stop certain schools from accepting all applicants regardless of their ability to carry on the work or to complete the course.

Changes in Ownership

Louis Binder has purchased the interest of John Shuls in the Binder Metal Products Co., 2940 Harrison Boulevard, and is now sole owner of the business in Los Angeles, Cal.

The Greenberg Sheet Metal Works, 375 Castro street, San Francisco, Cal., has been purchased by M. Resnick.

R. L. Cole has sold his plumbing and heating business in Okanogan, Wash., to Dave Kahlow.

The Metropolitan Sheet Metal Works, 2310 Griffith avenue, Los Angeles, Cal., has been discontinued by B. Epstein.

The D. H. Baird Co., sheet metal manufacturing, 9143 Central avenue, Detroit, Mich., has changed its name to Baird Manufacturing Co.

Chester Clapp has purchased a third interest in the Metal Products Company at 190 12th street, Oakland, Cal.

Herman Bauer has purchased the sheet metal business of Conrad Bayer, 880 Terrace street, Muskegon, Mich., and will continue under style of Bauer Tin Shop.

Wendel Matlock is reported buying Artcraft Metal Specialty Co., 14 Valencia street, San Francisco, Cal.

Benjamin W. Berg has purchased the Blakeway Sheet Metal Works, at 105 Beale street, in San Francisco, Cal.

A. W. Mattes has succeeded to the metal working shop and hardware business of Lulloff & Mattes, in De Pere, Wis.

Tom Solomon, of Brownsville, Tenn., has purchased the sheet metal shop operated formerly by John Coltart and will continue it at the same location on East Main street, near the Public Square. Mr. Solomon is an experienced tin worker.

Owen Lee Mitchell for the past five years with the Carey Roofing Co., Cincinnati, has joined Robert Minor as partner in the Acme Furnace and Roofing Co., 507 South Willow St., Chattanooga, Tennessee. The company is exclusive applicators for Carey cork-insulated shingles and for Sunbeam furnaces.

WHITNEY LEVER PUNCHES

No. 4B PUNCH



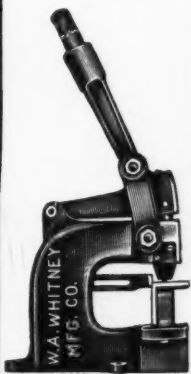
Length—8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—⅜" to ⅝" by 64ths.

No. 6 PUNCH



Length—26½ inches. Capacity—¼-inch hole through ⅜-inch iron; especially adapted for button punching or temp-let work. Punches and dies ¼" to ⅝" by 32nds.

No. 91 PUNCH



Capacity—¼-inch hole through ¼-inch, 1-inch hole through ⅜-inch and 2-inch hole through ½-inch iron. Depth throat 5 inches. Weight—82 lbs.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber

No. 1 PUNCH



Length—34 inches. Capacity—¾-inch hole through ¼-inch iron. Punches and dies in sizes from ¼" to ⅝" by 64ths.

No. 2 PUNCH



Length—23 inches. Capacity—¾-inch hole through ¼-inch iron. Punches and dies in sizes ⅜-inch to ½-inch by 64ths.

CHANNEL IRON PUNCH



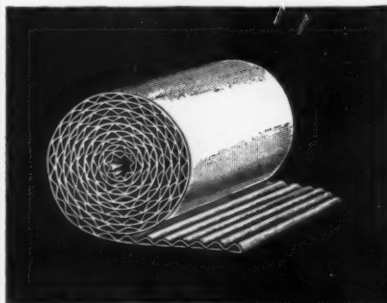
Companion to No. 2 Punch. Every part of the two Punches interchangeable, including punches and dies. Capacity—¼-inch hole through ¼-inch iron.

W.A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

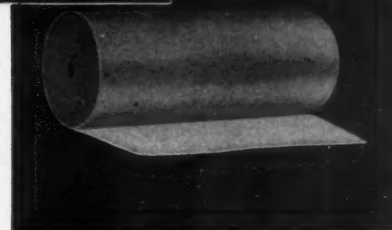
SAL-MO Asbestos Insulation Curbs HEAT LOSS in Warm Air Furnace Installations

... Assures More Efficient Operation.

(Left) SAL-MO Asbestos Aircell Paper



BE sure that your Warm Air Furnace installations do not have that 30% heat loss that is usual with uninsulated pipes. When you use SAL-MO Asbestos Papers and



Millboards you are **SAL-MO Asbestos Paper and Rollboard** sure of a perfect job and perfect insulation. SAL-MO Asbestos Products are of uniform high quality, manufactured from the best grade of Canadian asbestos fibre. Other SAL-MO Products include Pipe Joint Tape, Furnace Cement, Fireboard and coverings for all types of High and Low Pressure Pipe Lines.

SALL MOUNTAIN COMPANY
176 West Adams St. CHICAGO, ILL.

MARLEY DESIGNS a NEW Small Unit-

AN ALL-STEEL INDUCED DRAFT TOWER THAT BRINGS HIGHER COOLING EFFICIENCY TO THE SMALL CAPACITY FIELD



All the advantages of design and performance that feature the larger Marley water cooling systems now are available in this small tower—designed especially to cool limited quantities of water more efficiently and more economically.

Write for bulletin No. 500 giving full details.

THE MARLEY COMPANY
3000 Fairfax Road
Kansas City, Kansas

MARLEY
WATER COOLING SYSTEMS

THE EASY EDGER

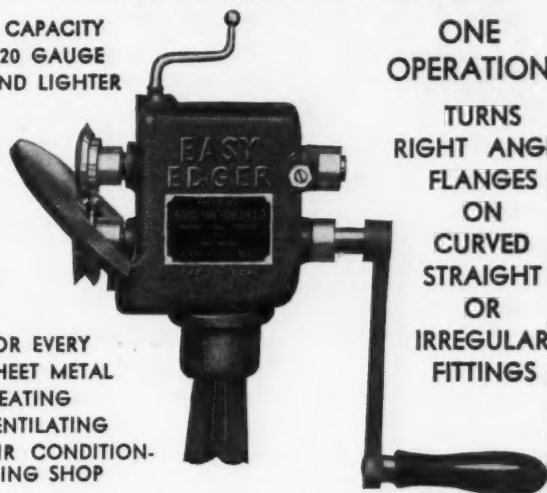
A FLANGING MACHINE THAT FLANGES IN—

CAPACITY
20 GAUGE
AND LIGHTER

ONE
OPERATION

URNS
RIGHT ANGLE
FLANGES
ON
CURVED
STRAIGHT
OR
IRREGULAR
FITTINGS

FOR EVERY
SHEET METAL
HEATING
VENTILATING
AIR CONDITION-
ING SHOP



NOTE—WILL TURN ONE HEIGHT FLANGE ONLY (⅜)

MORE SIMPLE
THAN A
BURRING MACHINE

NO GAUGES
TO
ADJUST

SPEEDY
ACCURATE
UNIFORM EDGES

WRITE FOR DETAILS

WARD MACHINERY COMPANY
564 W. WASHINGTON BLVD.
CHICAGO ILLINOIS



MULTITHERM
Conditioning Units

*Simplified—Compact
—Easily Installed
—Quiet Operation*

**Ideal for Stores, Cafes,
Theatres, Offices, etc.**

Last word in low-cost air conditioning. Easy to sell—and they stay sold because of guaranteed performance. Backed by 25 years' experience. Wide range of combinations—a unit of proper size and capacity for practically any cooling, heating or complete conditioning need. Quiet in operation.

Sizes up to 15,000 CFM.  Write for Bulletin 107.

CLARAGE FAN COMPANY • Kalamazoo, Mich.
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

Can be suspended from ceiling as shown, or floor mounted. Few if any building alterations required in order to install.

SPECIFY CLARAGE

for COMPLETE AIR CONDITIONING VENTILATION HEATING COOLING MECHANICAL DRAFT FANS & BLOWERS FOR INDUSTRIAL NEEDS



PREMIER FURNACE CLEANERS
COMPLETELY EQUIPPED

HALF HORSE POWER MODELS
60⁰⁰ and 64⁵⁰
ONE HORSE POWER MODELS
84⁵⁰ and 89⁵⁰

Premier Furnace Cleaners are powerful and light weight, yet sturdily built to stand years of rugged service. Weighing less than 50 pounds, they are one-man cleaners and have been the furnace man's favorite for years. Premier Cleaners are ideal for upstairs use and may be used independently from the container for suction and blowing use in cleaning air ducts, registers, grills, radiators and air conditioning equipment.

Motor specifications for these powerful cleaners are:
 $\frac{1}{2}$ H.P. maximum vacuum 31 inches in water.
 1 H.P. maximum vacuum 46 inches in water.

Business-Getting, Return Post Cards are Available for Dealers at Low Cost
 Buy It From Your Local Jobber or Write the Manufacturer
 Furnace Cleaning Instruction Booklet Free with Each Cleaner

ELECTRIC VACUUM CLEANER CO., INC.
 1734 Ivanhoe Road Cleveland, Ohio

New Incorporations

The California Metals Co. has engaged in business at 8018 South Main street, Los Angeles, Cal., under ownership of R. J. Kennedy and F. S. Waterman.

The Tisho Plumbing & Heating Co. has engaged in business at 336 East Second St., under management of Arrey Y. Okita.

The Southwestern Steel & Metal Co. has been incorporated in Los Angeles, Cal., with a capital of 51,000 shares, by Sidney H. Weiss, J. Cole and Milton M. Maharan.

Air Conditioners, Inc., has been chartered in Los Angeles, Cal., with a capital of \$20,000, by J. Gerald Brennen, F. E. Mars and Chas. B. Carpenter.

The Air Conditioning Corporation, Inc., has been chartered in Des Moines, Ia., with capital of \$50,000, by J. E. Van Liew, John K. Dunn and V. O. Marriott, and is located at 421 S. W. 4th St.

The Art Metal Manufacturing Co. has succeeded to the business of J. Brown & Co., 23 South Fourth street, Philadelphia, Pa.

The Liberty Sheet Metal Works has engaged in business at 311 West Juneau avenue, in Milwaukee, Wis.

The La Jolla Sheet Metal Works has been established in La Jolla, Cal., by James Arthur Winn and Raymond L. Maier.

Chester Merrill is about to engage in the sheet metal and furnace business on Washington street, between Second and Third, Hillsboro, Ore.

William Steimel has established a wire and sheet metal works at 312 West Juneau avenue, Milwaukee, Wis.

The General Installation Co. has been incorporated in St. Louis, Mo., with a capital of \$50,000, to engage in the air conditioning business, by Phillip C. Wise and Frank W. Williams, 506 Olive St.

The Advance Air Conditioning Co. has been incorporated in Tulsa, Okla., with a capital of \$10,000, by C. S. Neely, 2304 Wheat street, and C. A. Miner.

The Dean-Hagney Corporation has been chartered in Kansas City, Mo., to handle heating and ventilating equipment, with capital of \$15,000, by Frank J. Dean and others.

The Perfectaire Manufacturing Co. has engaged in business at 518 West Garfield avenue, Glendale, Cal., under ownership of Wm. B. Person and Henry E. Walker.

The Benn Sheet Metal Works, 1738 N. Umber St., Philadelphia, Pa., has engaged in fabricating sheet metal for air conditioning, under the management of B. Kaminsky.

The J. L. Douglass Co. has engaged in the heating and plumbing business at 4606 York Blvd., Los Angeles, Cal.

Harold Eraut, 411 N. W. 3rd Ave., Portland, Ore., has established a sheet metal works.

A certificate to conduct business under the firm name of Coast Sheet Metal Works, at 402 Front street, Burbank, Calif., has been issued to the owners: Laverne O. Persinger, of 432 East Sixth street, Burbank, and Merle L. Persinger, of 1912 Glendwood Road, Glendale, Calif.

Removals

A. Graff & Sons, manufacturers of art metal products at 37 Shipley street, San Francisco, Cal., will soon move to a new location at northwest corner of 13th and Willow streets in Oakland, Cal.

TO INCREASE YOUR HUMIDIFIER SALES

A sure bet for increasing your sales is this fully automatic SKUTTLE humidifier with its improved ceramics that insure the greatest efficiency in moisture distribution throughout the home. Write for information on the SKUTTLE line today!

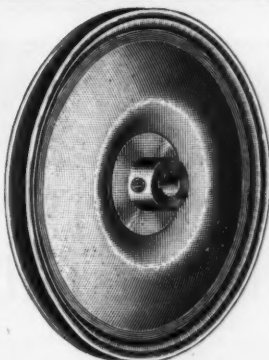
The ceramics are optional with all units.

Skuttle
AUTOMATIC HUMIDIFIERS

J. L. SKUTTLE CO. 999 FRANKLIN ST., DETROIT, MICHIGAN

MAUREY STEEL V-PULLEYS

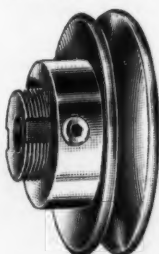
Specially Designed for
High Efficiency
Operation with
STOKERS, BLOWERS,
FANS, REFRIGERA-
TION, AIR CONDI-
TIONING and
Other Domestic Units



Balanced, true running and quiet at all speeds. Built to give long trouble-free service under severest use. Made with heavy rolled steel edges and SOLID STEEL or malleable iron hubs, machined. Carried in stock for "A" and "B" belts, in a wide variety of sizes. With DOUBLE GROOVE as well as single groove.

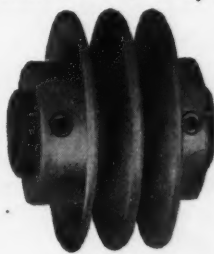
No Die Cast Hubs Used in MAUREY Pulleys.

MAUREY Variable Pitch Diameter Pulleys



Single Groove

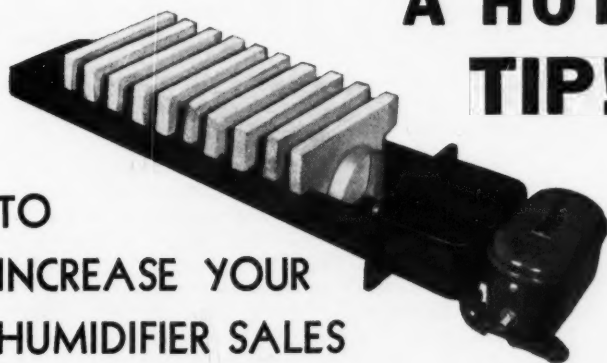
Solid steel construction. Adjustment permits speed variation of as much as 30%. Designed for Air Conditioning Units. Solid steel—not die cast. Made in 4 sizes, 3 1/4" to 4 1/2 inches in diameter.



Double Groove

MAUREY MANUFACTURING CORP.
Wabash at 29th Chicago, Ill.

A HOT TIP!



LET THIS New Type of Craftsman

CUT YOUR SERVICE AND INSTALLATION COSTS

Quality equipment properly installed and correctly serviced is a winning combination you can always depend on to bring that satisfied customer's recommendation so valuable to every business. You've always been able to control the quality of your equipment; and NOW you can control the quality of your installation and service work.

More than 100 leading manufacturers are officially endorsing and recommending the Training Program being conducted by the Refrigeration & Air Conditioning Institute under the direction and supervision of factory engineers, working right in the industry, so as to provide you with a source of dependable, highly skilled refrigeration and air conditioning service engineers. This *New Type of Craftsman*, created especially for the Refrigeration and Air Conditioning Industry is, in a way, a composite of all the crafts employed in air conditioning work insofar as they are used in Air Conditioning installations. He can help you increase your net profits in three ways:—first, Eliminates the need for costly training; second, Reduce your service expense; third, Helps to develop new business through satisfied customers. He is then, a man who can become a definite asset to your business from the first day his name is added to your payroll.

The individual qualifications of each man trained by the Refrigeration & Air Conditioning Institute is recorded in a form which enables you to select, at a glance, the man best suited to your needs. . . . Mr. Employer, will you let us shoulder your *Training Costs* and help you solve your man-power problem?

MORE THAN 100 LEADING MANUFACTURERS "OFFICIALLY" ENDORSE AND RECOMMEND THIS TRAINING PROGRAM

Ray K. Smith
PRESIDENT

REFRIGERATION & AIR CONDITIONING INSTITUTE

Division of the Industrial Training Corporation
2130-2158 Lawrence Avenue • CHICAGO, ILLINOIS

BENDING
BRAKES

WHITNEY-JENSEN

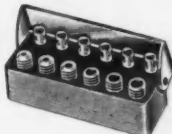
METAL
TOOLS

TOOLS YOU NEED TODAY!



No. 5 JR. PUNCH

• Light and strong. A handy tool in any shop. Over 25,000 in use all over the world. Kit includes 7 punches and dies, with no-lose-out holder. Furnished in cardboard or metal box. Weighs only 2 1/2 lbs. Capacity, 1/4" hole in 16 ga. metal. Punches in center of 3".



HOLLOW PUNCH SET

• Changeable handle. Self-centering punches with locating spring point. Complete with wood holder base as shown. Bit sizes: (Set No. 1) 3/8" to 7/8" by 1/8", (Set No. 2) 1" to 2" by 1/8", (Set No. 3) 2 1/4" to 3" by 1/8".



SOLID PUNCH SET

• Octagon handle. Made from high grade tool steel. Set includes 10 punches, from 1/8" to 13/32" by 1/32". Complete with wood holder.



PUNCH BASE

• Universal design. For Nos. 7, 7 1/2, and 8—Imperial Whitney-Jensen Roller Bearing Punches. Quickly converts hand punch to bench tool. Swivel clamp. Table drilled and tapped for locating stops, etc. Very useful in semi-production work.



Write for new Catalog No. 11

WHITNEY METAL TOOL CO. - 91 Forbes Street, Rockford, Illinois

New Literature . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 98.

221—Superfex Oil Air Conditioner

Perfection Stove Company, 7609 Platt Avenue, Cleveland, Ohio, is distributing sheets telling the story of the Superfex oil-burning warm air conditioner, to the home owner, to the builder, and to the architect.

222—"Heatmaker" Stoker

Iron Fireman Mfg. Co., Cleveland and Portland, Oregon, is distributing a folder announcing the DeLuxe Heatmaker stoker for 1938, which they say creates a clear bright fire—smokeless, wasteless and efficient. Illustrations set forth the advantages of forced underfeeding.

223—Insulating Ducts

Cork Import Corporation, 330 West 42nd St., New York City, is distributing a 4-page folder describing their Novoid Corkboard, designed to meet the insulation requirements of small commercial air conditioning systems where the problem is only to prevent condensation and not to conserve refrigeration. Suggested specifications and a page of construction details are included.

224—Almar-Bittner Power Flanger

Ward Machinery Company, 564 W. Washington Blvd., Chicago, has prepared for distribution a four-page folder covering their new Almar-Bittner power flanger for forming right angle flanges at a speed of 15 to 25 feet per minute on 16-gauge metal. The material stays flat on the table while being flanged.

225—Fire Tools—Stoker Screws

Farrell-Cheek Steel Company, Sandusky, Ohio, is dis-

tributing an 8-page booklet listing and describing their fire tools—clinker tongs, ash and fire hoes, clinker rakes, clinker hooks, etc.—required wherever coal or coke are used for light, heat and power.

Another folder covers integrally cast stoker screws listing sizes available.

226—Pocket-size Catalog

The Emerson Electric Manufacturing Company offers a pocket-size 24-page catalog featuring for the 24th consecutive year their well-known 5-Year Factory-to-User Guarantee. The full line of Desk Fans, Air Circulators, Ceiling Fans, Exhaust and Ventilating Fans are illustrated and described. Mechanical features, performance data, and prices are included in this compact booklet.

227—Oil A. C. Furnace

Wayne Oil Burner Corp., Fort Wayne, Indiana, is distributing a four-page folder covering The Wayne oil furnace and air conditioner, which provides automatically filtered warmed, humidified, circulating air. Each of the four flue gas outlets have to pass ten feet over the radiating surface before reaching the smoke pipe—a total flue travel of 40 feet. Stack temperature, they say, is too low to operate stack control or relay.

228—G-E Publications

General Electric Company, Schenectady, N. Y., is distributing the following new literature—Arc Welders Improved for Still Better Performance (GEA-1440F), Type B Direct-current Motors in both adjustable and constant speed (GEA-1542C), and Manual Motor-Starting Switch for the control of fractional-horsepower motors by hand operation (GEA-2234B).

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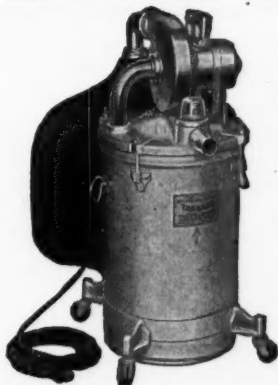
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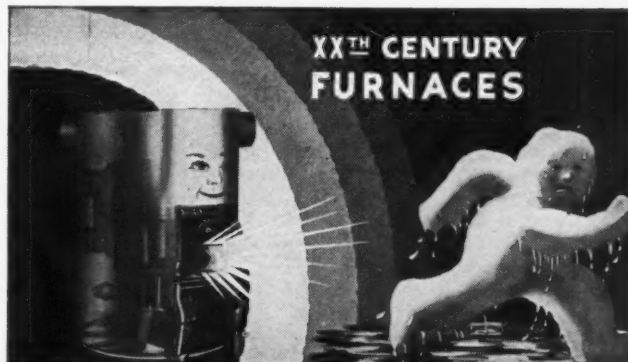
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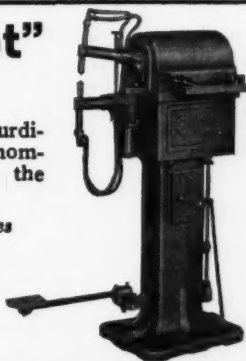
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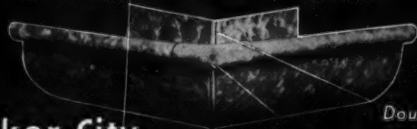
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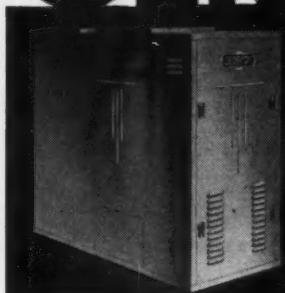
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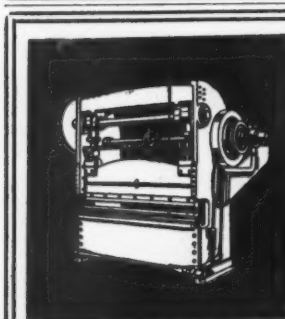

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New Literature . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 98.

229—For Dealer Distribution

The Emerson Electric Mfg. Co., St. Louis, offers two new fan folders—X2463 and X2464—intended for the consumer, illustrating and describing Emerson-Electric exhaust and ventilating fans in reasonable quantities to retailers.

230—Sound Control of Mechanical Equipment

Johns-Manville Sales Corporation, 222 North Bank Drive, Chicago, is offering a brochure containing selected data sheets on "Sound Control of Mechanical Equipment" including J-M Air-Acoustic sheets.

231—Rycrome and Nikrome "M" Steels

Joseph T. Ryerson & Son, Inc., 16th & Rockwell Sts., Chicago, is distributing a 4-page bulletin giving comprehensive description and data on the high physical properties of Rycrome and Nikrome "M"—two heat treated alloy steels used for a great variety of heavy duty applications.

232—Multitherm Conditioning Units

Clarage Fan Company, Kalamazoo, Michigan, is distributing Edition No. 2 of their Bulletin 107, illustrating and describing their Multitherm conditioning units, for cooling, dehumidifying, heating, humidifying and cleaning. Heating, cooling, speed and horsepower tables and other data complete the 36 pages.

233—Fabrication, Welding, Riveting and Soldering

Carnegie-Illinois Steel Corporation, 434 Fifth Avenue, Pittsburgh, is distributing a 64-page booklet entitled "The Fabrication of USS Stainless Steels, Part I," issued by the United States Steel Corporation Subsidiaries.

The new book describes in detail the welding, riveting and soldering techniques applicable to all the various grades of USS Stainless Steels. An introduction deals with the three principal classifications of stainless steels, namely, the austenitic, ferritic and martensitic steels. The austenitic include USS 18-8, 18-8 Mo., 18-8 Ti, 18-8 Cb., 19-9, 25-12, 25-20; the ferritic includes USS 17, 21 and 27, and martensitic stainless steels such as USS 12.

Each of these types of steels is analyzed with reference to fabrication procedure. Fusion welding, including metal arc welding, acetylene and atomic hydrogen welding, and the welding of stainless to carbon steels are described as applied to austenitic, ferritic and martensitic USS Stainless Steels successively. Annealing and heat treatment of these steels, primarily as a method of relieving stresses developed in welding, are subjects fully treated.

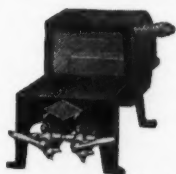
The finishing of welds on stainless steels, including grinding and polishing, as well as the removal of scale by sand-blasting, pickling and passivation, are briefly described. Formulae for pickling solutions, and directions for building pickling and passivation tank, and similar useful data are helpful features for stainless steel fabricators.

Concluding the section on welding are pages on the resistance welding of stainless, particularly austenitic steels. Flash, spot, projection and seam welding, together with the latest electrical and mechanical controls, present new opportunities for high-speed, profitable fabrication.

Among the topics developed under the heading of riveting are the preparation of plates for riveting, typical shop procedure including driving temperatures for austenitic, ferritic and martensitic steels, and caulking. Likewise both soft and hard or silver soldering techniques are explained, with recommendations as to installations best suited for welding, riveting or soldering, or combinations of these joining methods.

A final feature of the book portrays over thirty types of joints and contains suggestions as to joint design for the wide range of products which are now fabricated from USS Stainless Steels.

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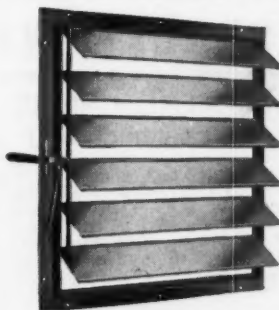
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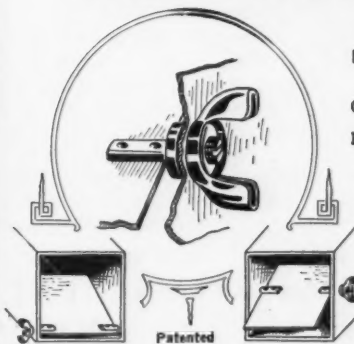
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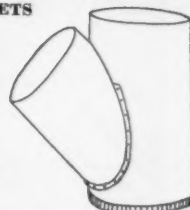
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New Literature

For your convenience in obtaining copies of new literature, use the coupon on this page.

234—Estimating Chart

The Excelsior Steel Furnace Co., 114 S. Clinton Street, Chicago, has developed in the interest of installers of air conditioning a labor saving estimating chart and material list.

235—Net Trade Prices

International Heater Company, 1933 Wentworth Avenue, Chicago, is distributing a new net trade price list for International warm air furnaces and air conditioning units, effective May 2, 1938.

236—Anemostat

Anemostat Corporation of America, New York City, is distributing an 8½ x 11 booklet covering their anemostat for draftless air distribution, mixing room air, with conditioned air within the device; permitting higher velocities, greater temperature differentials; and resulting in smaller ducts, smaller plants and reduced operating expenses.

237—New and Rebuilt Machinery

Interstate Machinery Co., Inc., 109 S. Clinton St., Chicago, Illinois, is distributing Catalog No. 803, listing and describing their new and rebuilt sheet metal working machinery and tools. They report over 2000 new and rebuilt metal working machines in stock—presses, shears, brakes, shapers, etc.

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238—Sprayo-Flake

Sprayo-Flake Company, 2715 Irving Park Blvd., Chicago, is offering a 12-page catalog on their insulation—sprayed on with guns—for heat, sound and acoustical correction.

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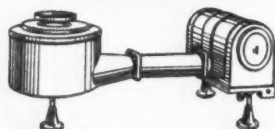
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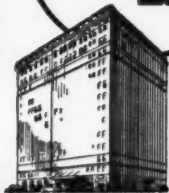
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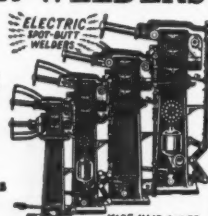
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WANTED experienced Blower sales engineers to sell simplified ultra-modern industrial vacuum cleaning systems (permanent installations) to industrial plants. Exclusive territory, straight commission, opportunity to make \$10,000 or more a year. Good man or firm wanted in all principal cities especially New York City, Boston, Cleveland, Indianapolis, Detroit, etc. Address Connecticut Blower Company, 183 Ann St., Hartford, Connecticut.

SALESMEN WANTED: In states of Tennessee, Virginia, North Carolina, South Carolina and Georgia. Complete line furnaces, air conditioning equipment, boilers, radiation, etc. Commission basis. Address Key No. 434, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

WANTED—Experienced heating engineer calling on dealers and jobbers to handle on commission, complete line direct fired oil or gas air conditioning equipment, also split steam and cooling units. Product thoroughly field proven. Address Dail Steel Products Company, 1050 Main St., Detroit, Mich.

SITUATIONS WANTED

Sheet Metal and furnace man. 10 years experience. 35 years old. Can lay out own work. State wages and hours. Address Sidney McDonald, Attica, Indiana.

FOR SALE

FOR SALE: Established Sheet Metal Business, Tulsa Sheet Metal Co., 13 & 15 South Lansing, Tulsa, Okla.

Use AMERICAN ARTISAN Classified Advertising for quick results. It puts you in direct touch with the buyers and sellers in the warm air heating, sheet metal contracting and air conditioning industry.

AMERICAN ARTISAN Service Section

SHEET METAL MACHINES

• Announcing

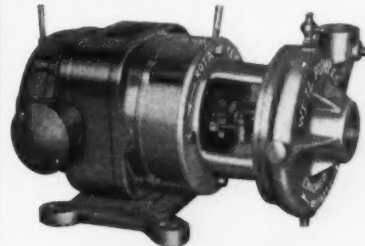
4 NEW MAPLEWOOD MACHINES

1. Model "E" 2 in 1 Rolling Machine. Forms Pittsburgh Lock and Drive Cleat (in 1 operation).
2. Model "D" 10 in 1 Combination Machine for
 - Slitting
 - Wiring
 - Turning
 - Burring
 - Cutting & Edging (1 operation)
 - Making Elbows (2 operations)
 - Single Beading
 - O. G. Beading
 - Crimping
 - Edge Straightening
3. Ingels Gap Gang Punch 10 holes with 1 stroke
4. High Speed—Specially Built Pipe & Lock-Rolling Machines for volume Production.

For full particulars and prices
WRITE ON YOUR LETTERHEAD

**MAPLEWOOD
MACHINERY COMPANY, INC.**
2634 Fullerton Ave., Chicago, Ill.

AIR WASHER PUMP



Ask For Bulletin R-5500 Electropump
WEIL PUMP COMPANY
Wells and Superior Sts. CHICAGO, ILL.



**"DO-ALL" Combination
Electric Hammer & Drill**
drills both concrete and metal. Cap. 1 1/4" in concrete—3/4" in metal. Saves time and money in setting expansion bolts, anchors and plugs. Room pays for itself. Easy to maintain. Bulletin 371. Wedgick Electric Tool Corporation, 4844 W. Huron St., Chicago, Ill.

WANTED

ONE HUNDRED Warm Air Heating and Air Conditioning Dealers to establish permanent retail and installation business in Natural Gas territories. Proven positive need for men knowing the business to direct the selling, supervise installations, provide trained mechanical help for installations, and service. You can make money by writing immediately to Key 432, American Artisan, 6 No. Michigan Ave., Chicago, Illinois.

The American Artisan Service Section presents a golden opportunity to contact a national circulation at comparatively small cost. Manufacturers can use it to make any article sell and dealers will find it an inexpensive way to contact a live buying trade. Don't delay—send in your copy now for the next issue. See bottom of page for rates.

Let Books Help You Build Your Business

Whatever problems you may run into in gravity or forced warm air heating, air conditioning, sheet metal, or ventilating work, you can depend on finding information to help you solve them speedily and correctly in one or another of the many books that are now available for contractor-dealers in this field. Often a single idea or bit of data brought to you in a book repays the book's cost dozens of times over. Increase your knowledge and your capacity to earn by building up your business library. Write today to the Keeney Publishing Company, 6 N. Michigan Avenue, Chicago, Ill., for complete catalog of books on warm air heating, air conditioning, and sheet metal subjects.

SERVICE SECTION: Rates for display space similar to above in Service Section are \$5.00 per inch per insertion. One-inch minimum space accepted. **Classified Section:** Rates for classified advertising are 5 cents for each word including heading and address. Count seven words for keyed address. Minimum \$1.00 for each insertion. Cash must accompany order.

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SAVE TIME ON YOUR AIR CONDITIONING JOBS

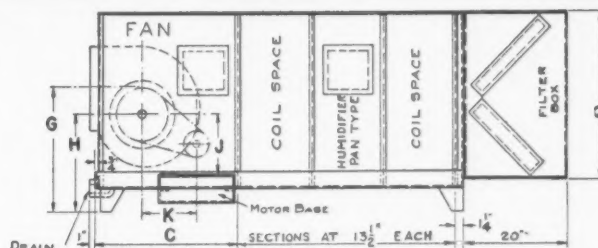


with *"Buffalo"* CENTRAL CONDITIONING CABINETS

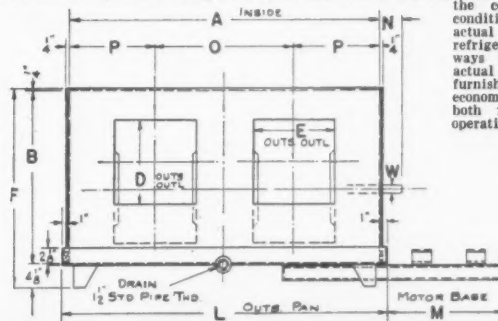
YOUR time is money. To save that time both on the installation and service on your air conditioning work means more profits for you—better customer satisfaction.

You can give yourself the full benefit of these advantages by installing Buffalo "P. C." Central Conditioning Cabinets on all of your important air conditioning contracts.

Buffalo "P. C." Cabinets, like all Buffalo ventilating and air condition-



Buffalo Forge Company is licensed to manufacture conditioning cabinets utilizing the Auditorium By-Pass patents. In the By-Pass system, the full supply of air is kept circulating to and through the rooms and back to the conditioner. By limiting the cooling in the conditioner to the actual heat load the refrigeration is always limited to the actual needs, thus furnishing the most economical design in both first cost and operation.



ing equipment, are built to operate quietly—and free from vibration and chatter. Bearings are rubber insulated. Cabinet design is rugged and substantial without unnecessary weight.

Cabinets are available in capacities from 3 tons up and in combinations suitable for simple cooling or complete year 'round air conditioning.

For details, sizes, etc. write for Bulletin 502.

BUFFALO FORGE COMPANY

497 BROADWAY, BUFFALO, N. Y.

Branch Engineering Offices in Principal Cities

IN CANADA: CANADIAN BLOWER & FORGE CO., LTD., KITCHENER, ONT.

Say, we're really going
to town with this
KUEHN'S SQUARE GUTTER

Yes, and now **MILCOR** is giving
us the same big features
in **KUEHN'S HALF-ROUND
GUTTER**

Right! And this stronger, handsomer new
gutter in popular sizes costs you no more
than ordinary half-round.

New sales records are being set everywhere by
Kuehn's Square Gutter, with its seven exclusive
features. Now Milcor gives you those same sales-
producing features in Kuehn's Half-Round Gutter.

It puts you miles ahead of competition on those
profitable jobs. Yet the price to you is the same
as ordinary half-round (4" and 5" sizes).

The decorative fluting and other unique points
of Kuehn's Half-Round Gutter give you the sturdy,
neat looking job you're proud of — a job that
leads to others, as your pleased customer tells
his friends . . . The exact manufacturing methods
of Milcor mean absolute uniformity and preci-
sion, making Kuehn's Half-Round Gutter easy to
handle, simple to hang. Jobs go faster, end up
with more net profit . . . Here's your chance to
build a quality reputation for your shop. Use
Kuehn's Half-Round Gutter on your next job. Write
for colorful descriptive literature and free sample.

G-21

Unit of the
Complete **MILCOR**
Rain-Carrying Line

MILCOR STEEL COMPANY

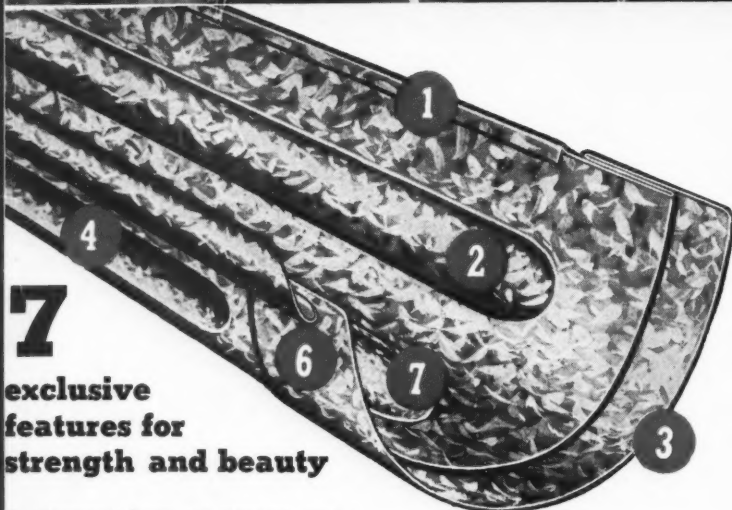
MILWAUKEE, WISCONSIN

CANTON, OHIO

Chicago, Ill.

Kansas City, Mo.

La Crosse, Wis.



7
exclusive
features for
strength and beauty

1 Hemmed here for strength and
easy handling.

2 Decorative Flute adds strength.

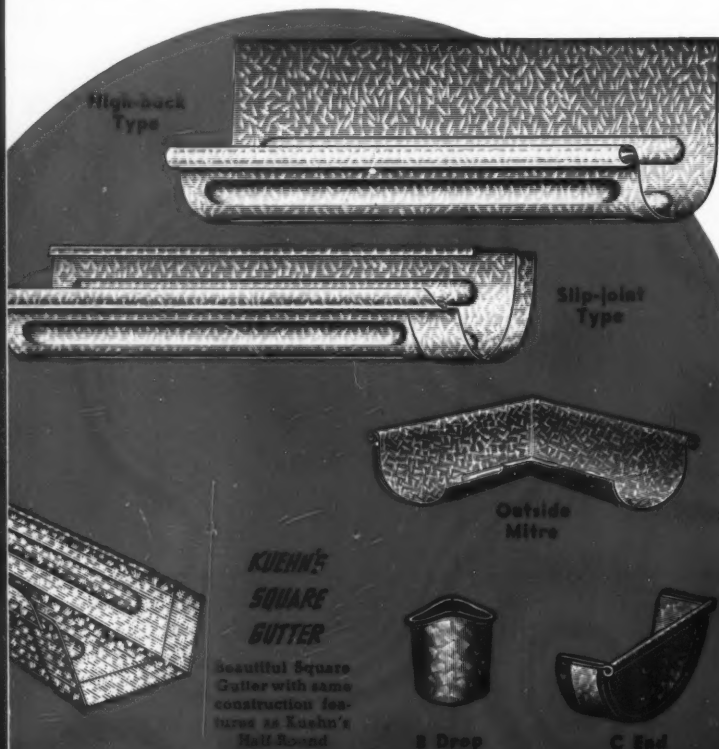
3 Perfect Formation of half round
shape.

4 Fluting on Outer Side reinforces
and beautifies.

5 Precision Manufacture makes
trough straight and true.

6 Outer Bead has stiffening tongue.

7 Decorative and Reinforcing
Flute on bottom.



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